News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

For Release

Beth Schmid
Headquarters, Washington, DC
(Phone: 202/358-1760)

January 7, 1999

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NOTE TO EDITORS: N99-1

STS-95 CREW TO VISIT WASHINGTON

The STS-95 Space Shuttle astronauts will visit Washington, DC, on Friday, Jan. 8, to discuss their mission with NASA Headquarters employees in the Headquarters auditorium, 300 E St., SW, from 9 – 10 a.m. EST. Media representatives are welcome to attend this employee event on a first-come, first-served basis.

Mission commander Curtis L. Brown; pilot Steven W. Lindsey; mission specialists Scott E. Parazynski, Stephen K. Robinson and Pedro Duque; payload specialists Chiaki Mukai and Senator John Glenn will participate in the mission discussion.

After the presentation, the astronauts will visit the National Institutes of Health in Bethesda, MD, from 10:45 – 12:30 p.m. EST, where Secretary of Health & Human Services, Dr. Donna Shalala, will host their visit. Media representatives may attend this employee event on a first-come, first-served basis, however, seating will be limited.

The crew will visit NASA's Goddard Space Flight Center in Greenbelt, MD, at 2 p.m. EST. The presentation to Goddard employees will be in the Auditorium in Building 8. Media representatives may attend this employee event, however, seating will be limited. Due to schedule constraints, only employees will be able to ask questions at these events.

-end-

News Release

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For Release
January 7, 1999

NOTE TO EDITORS: N99-2

STARDUST MISSION PRELAUNCH SCIENCE BRIEFING SCHEDULED FOR JANUARY 13

Managers and scientists leading the team preparing the Stardust spacecraft to gather samples of icy comet dust and return them to Earth will conduct a media briefing on the mission and its science goals on Wednesday, Jan. 13, at 2 p.m. EST. The televised briefing will originate from NASA Headquarters in Washington, DC.

Set for launch from Cape Canaveral Air Station, FL, on Feb. 6, 1999, Stardust will be the first U.S. mission dedicated solely to a comet and the first return of extraterrestrial material from outside the orbit of the Moon.

The primary goal of this Discovery Program mission is to collect comet dust and related measurements during a planned close encounter with comet Wild 2 (pronounced "Vilt-2") in January 2004. Additionally, the Stardust spacecraft will bring back samples of interstellar dust particles, recently discovered material streaming into the Solar System. Ground-based analysis of these samples after their return in January 2006 should yield important insights into the evolution of the Sun and planets, and possibly into the origin of life itself.

Presenters at the briefing are scheduled to include:

Dr. Carl Pilcher, science director for Solar System exploration at NASA Headquarters
Dr. Kenneth Atkins, Stardust project manager at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA

-more-

Dr. Donald Brownlee, Stardust principal investigator from the University of Washington, Seattle
Joseph Vellinga, Stardust program manager at Lockheed Martin Astronautics, Denver, CO
Dr. John Rummel, Planetary Protection Officer, NASA Headquarters

Extensive information on Stardust, including mission-related art and images, and a public signature disk attached to the spacecraft, is available on the Internet at the following URL:

http://stardust.jpl.nasa.gov/

NASA Television is located on GE-2, transponder 9C at 85 degrees West longitude, vertical polarization, with a frequency of 3880 Mhz, and audio of 6.8 Mhz. There will be two-way question–and-answer capability for media at participating NASA centers.

-end-

News Release

National Aeronautics and
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For Release
January 7, 1999

RELEASE: 99-1

**NASA TECHNOLOGY ASSISTS IN DETECTING
NATURAL MARINE OIL SEEPS IN THE GULF OF MEXICO**

NASA is teaming with industry to identify natural marine oil seeps in the Gulf of Mexico, offering clues on oil deposits. Through the Commercial Remote Sensing Program at NASA's Stennis Space Center, Stennis, MS, NASA is demonstrating practical applications of space technologies in America's marketplace. One such partnership is between the Earth Observation Commercial Applications Program (EOCAP) at Stennis and the Earth Satellite Corporation (EarthSat), of Rockville, MD, a company that is using remote sensing technology to help identify the oil seeps in the Gulf of Mexico.

Remote sensing uses sensors mounted on aircraft or satellites to look at the Earth's surface. Information gathered by these sensors can be used to make detailed maps of specific areas around the planet. These maps have many uses, such as roadway planning, disaster assessment, or as in the case of EarthSat, to help identify marine oil seeps.

Oil migrates naturally through cracks from deposits deep below the ocean floor, releasing oil into the world's surface waters. These marine oil seeps offer clues as to where oil deposits may be located in ocean basins. Marine oil seeps occur naturally and are manifest as oil slicks on the ocean's surface.

"Oil seep detection is a market that has not been addressed by any other EOCAP partnerships," said Mark Mick, NASA's EOCAP manager at Stennis. "I also think it is a good application for remote sensing technology."

This NASA/industry partnership uses remote sensing and related technologies to explore markets for NASA Earth sciences-related products that will enhance opportunities for industry customers. Such partnerships can last up to two years. These NASA/industry partnerships help promote the use of products based on remote sensing technologies in

-more-

markets where such technologies are underutilized or are not used at all. NASA's technical and financial participation helps reduce the market risk associated with new product development to a level that partnering companies can accept. This allows small companies to explore the use of remote sensing without exposure to excessive financial risk.

To detect oil seeps, EarthSat uses radar satellite data from RadarSat International, a joint NASA-Canadian Space Agency mission in Richmond, British Columbia, Canada, and at times from radar data of the European Space Agency and the U.S. Landsat Thematic Mapper. The radar data measures changes in the texture of the ocean surface, which differs noticeably if an oil slick is present. The very thin oil layer on the water dampens the small (capillary) waves, making the radar image appear dark. Oil companies may use this information to identify areas with potential hydrocarbon deposits and plan their seismic exploratory activities.

The advantage to companies of EarthSat's spaceborne radar survey technique is that it is less expensive than aerial surveys and it allows oil companies to concentrate their explorations in areas that are most likely to be oil-rich. A satellite survey of an area of the ocean costs tens of thousands of dollars while a typical seismic survey has a price tag of hundreds of millions of dollars. "If you find oil seeping out of the ocean floor, it makes the decision to spend millions of dollars on a seismic survey much easier," said Roger Mitchell, Vice President of EarthSat.

As a result of its partnership with NASA, EarthSat and its industry partner, RadarSat International, were recently awarded the prestigious 1998 Canadian-American Business Achievement Award. The award was created in 1994 to recognize and promote the positive contribution that innovative business alliances between the United States and Canada can produce.

The commercial remote sensing program at Stennis is funded by the Earth Science enterprise, NASA Headquarters, Washington, DC. The Office of Earth Science seeks to understand the total Earth system and the effects of natural and human-induced changes on the global environment.

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News Release

National Aeronautics and
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For Release

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Headquarters, Washington, DC
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January 8, 1999

RELEASE: 99-2

NASA SELECTS 125 INNOVATIVE SMALL BUSINESS PROJECTS

NASA has selected 125 research proposals for negotiation of Phase 2 contract awards for NASA's Small Business Innovation Research (SBIR) Program. The selected projects, which have a total value of approximately $73 million, will be conducted by 113 small, high technology firms located in 26 states.

The goals of this NASA program are to stimulate technological innovation, increase the use of small business (including women-owned and disadvantaged firms) in meeting federal research and development needs, and increase private sector commercialization of results of federally funded research.

A total of 312 proposals was submitted by SBIR contractors completing Phase I projects. These proposals were evaluated to determine that they meet SBIR Phase 1 objectives and are feasible research innovations for addressing agency needs.

Phase 2 continues development of the most promising Phase 1 projects. Selection criteria include technical merit and innovation, Phase I results, value to NASA, commercial potential and company capabilities. Funding for Phase 2 contracts may be up to $600,000 for a two-year performance period.

The NASA SBIR Program Management Office is located at NASA's Goddard Space Flight Center, Greenbelt, MD, with executive oversight by NASA's Office of Aero-Space Technology, NASA Headquarters, Washington, DC. Individual SBIR projects are managed by NASA's ten field centers.

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EDITOR'S NOTE: A listing of the selected companies can be accessed on the Internet at URL: **http://sbir.nasa.gov**

News Release

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For Release

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January 14, 1999

Nancy Neal
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RELEASE: 99-3

HUBBLE TECHNOLOGY BENEFITS NEW SATELLITE PHONE SYSTEM

Computer software developed for NASA's Hubble Space Telescope will soon help operate a worldwide, satellite-based phone system called Globalstar™. This software is a key feature of NASA Goddard Space Flight Center's "Vision 2000," a forward-looking effort to optimize the ground system operations and control of the Hubble Space Telescope.

The "Vision 2000" software allows scientists and engineers to access and display Hubble spacecraft- and ground-systems data through the Internet. Now engineers can log on from home or other remote locations via their personal computers.

This Hubble spinoff will provide Globalstar, LP, San Jose, CA, with the technology to aid in delivering voice, data, fax and other telecommunications services to users worldwide. The spinoff technology will satisfy the critical need for Globalstar engineers to remotely access spacecraft telemetry data from anywhere in the world. Globalstar team members and partners will be able to coordinate efforts, and dynamically monitor and troubleshoot situations with the constellation of 48 low-Earth orbiting satellites from multiple locations.

As part of its mission to build technology partnerships with industry, Goddard, in Greenbelt, MD, where the Hubble Space Telescope is controlled, has authorized Lockheed Martin Technology Services Group, Seabrook, MD, to use this software for the commercial Globalstar™ project. Lockheed Martin Technology Services Group is a ground-system contractor to Globalstar, LP.

"This technology transfer partnership with Lockheed Martin shows an example of a technology developed to meet NASA's Hubble Space Telescope mission requirements that also satisfies a need in the commercial marketplace," said Marguerite Broadwell, Intellectual Property Rights Advisor at Goddard.

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Goddard is in the process of evaluating the software to determine other viable commercial applications. Companies interested in pursuing commercialization of this or any other Goddard-developed technology are encouraged to contact Goddard's Technology Commercialization Office at 301/286-5810.

- end -

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January 15, 1999

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RELEASE: 99-4

NASA HURRICANE STUDY REVEALS INTRIGUING RESULTS

NASA and other weather researchers have gained intriguing new information about upper-level winds that drive hurricanes and the devastating impact of the storms as they collide with mountains.

The research is from a seven-week study conducted last summer during the Third Convection and Moisture Experiment (CAMEX-3) that involved NASA, the National Oceanic and Atmospheric Administration (NOAA) and several universities in a concentrated effort to gauge the strength of Atlantic hurricane winds and rainfall.

"The wind patterns flowing into and out of the hurricanes at the upper altitudes were much more complicated than had been anticipated," said the lead mission scientist, Robbie Hood of NASA's Marshall Space Flight Center, Huntsville, AL. "At times, strong wind gusts were recorded at positions farther from the eyewall or with magnitudes greater than expected."

CAMEX-3 used a variety of data-gathering instruments aboard aircraft and spacecraft. Researchers flew aboard NASA's specially equipped DC-8 jetliner into hurricanes Bonnie, Danielle, Earl and Georges. An instrument-laden NASA ER-2 high-altitude aircraft also was flown above the hurricanes to collect first-of-its-kind data. Researchers utilized data from the Tropical Rainfall Measuring Mission satellite and from specially designed laser instruments aboard the DC-8. The data are expected to help weather forecasters better predict storm strength and direction -- potentially saving lives and reducing evacuation zones along coastal areas.

"The multi-aircraft datasets obtained by NASA aircraft in these hurricanes are unprecedented in their comprehensiveness," said Dr. Ed Zipser, a weather expert from Texas A&M University in College Station. "They will provide researchers with the

-more-

raw material to understand severe storms and their environment, and lead to improved track and intensity forecasts in the future."

"The amazing thing about this data from Georges is that the rain was enhanced significantly by the mountains in the interior of the Dominican Republic," said NASA researcher Dr. Gerald Heymsfield of NASA's Goddard Space Flight Center, Greenbelt, MD. "We got a glimpse of the storm's impact with the mountainous island and the subsequent rain that eventually caused significant loss of life."

Heymsfield's images from a Doppler radar on the high-altitude aircraft show Hurricane Georges slamming into 9,000-foot mountains -- producing what appeared to be huge thunderstorms over the mountains.

"Understanding this very complicated interaction between Hurricane Georges and the mountains will keep us busy for a while," said Heymsfield.

The two NASA aircraft were flown a combined total of 132 hours over the month-long mission to sample various aspects of the hurricane environment. Information from three storms was captured while they made landfall. The hurricane team also utilized ground-based instruments on Andros Island, Bahamas, to monitor the daily tropical environment before and after each storm.

"Since each hurricane has its own personality with varying characteristics, having information describing four different storms represents a tremendous opportunity to improve our understanding of how hurricanes develop, change and move," said Hood. "Although these opportunities don't provide immediate comfort to those who directly experienced this season's devastating storms, the wealth of information collected by all the agencies will lead to better hurricane forecast capabilities in the future," she added.

"The real success of CAMEX-3 was the breadth of hurricane information collected," said Dr. Ramesh Kakar of NASA Headquarters in Washington, DC, who is the atmospheric dynamics and remote sensing program manager. "The combination of scientists from eight NASA Centers, and the multi-agency, multi-university teamwork of CAMEX-3 was a tremendous example for future research activities."

Kakar said key to the success of CAMEX was assistance to NASA from numerous universities; the pilots and crews from NASA's Dryden Flight Research Center, Edwards, CA; team members from Goddard and NASA's Langley Research Center, Hampton, VA; and the project management staff from NASA's Ames Research Center, Mountain View, CA. "We're very grateful for the advice and coordination efforts of NOAA and the support from the Air Force Reserve 53rd Weather Squadron at Keesler Air Force Base, MS. Help from the Federal Aviation Administration allowed the CAMEX-3 investigators to capitalize on key research opportunities when they arose," he added.

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For Release

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January 20, 1999

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NOTE TO EDITORS: N99-4

NASA ANNOUNCES DELAY IN SHIPMENT OF CHANDRA OBSERVATORY

NASA today announced that it will delay this month's planned shipment of its Chandra X-ray Observatory from prime contractor TRW Space and Electronics Group, Redondo Beach, CA, to NASA's Kennedy Space Center , FL. The postponement will allow TRW to evaluate and correct a potential problem with several printed circuit boards in the observatory's command and data management system.

TRW notified NASA of the potential problem last week after another spacecraft being built by the company experienced a failure during testing that was attributed to similar printed circuit boards. The failed boards and those in Chandra were all made by BF Goodrich Aerospace, Davis Systems Div., Albuquerque, NM, in the same time frame in 1996. The problem has been traced to poor conductivity between different layers of the boards.

The boards are used in Chandra's main command and telemetry unit and four remote units. These units provide command and data communications links between the observatory's computer and subsystems.

NASA has directed TRW to remove and replace the boards in the main unit, and to conduct further tests and evaluation to determine if it is also necessary to replace the boards in the remote units. The repair, if limited to boards in the main command and telemetry unit, is expected to delay shipment to Kennedy by approximately one week. This will result in approximately a five-week slip in the observatory's launch readiness date, which will allow for integration and testing of the units at Kennedy. If boards in the remote units must also be replaced, a more extensive slip is anticipated.

- end -

News Release

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For Release

January 21, 1999

RELEASE: 99-5

NASA SCIENTISTS, ENGINEERS WILL TALK TO STUDENTS ON THE INTERNET DURING BLACK HISTORY MONTH

Students from around the world will get the opportunity to 'chat' with NASA's African-American scientists, engineers and others over the Internet during February, Black History Month. During these chats, students with access to computers can type their questions and receive answers from the experts.

The chat sessions begin on Tuesday, Feb. 2, at 2:30 p.m. EST with Dr. Aprille Ericsson-Jackson, an aerospace engineer at NASA's Goddard Space Flight Center, Greenbelt, MD. During the chats, Ericsson-Jackson and the other African-American professionals will describe their contributions to the space program. "I feel obligated to help spur the interest of minorities and females in the math, science and engineering disciplines," said Ericsson-Jackson. She received the "Women in Science and Engineering" award as the best female engineer in the federal government in 1998.

Representing diverse careers, scheduled participants include a NASA nutritionist, an aerospace engineer and an operations specialist from mission control at NASA's Johnson Space Center, Houston, TX. "NASA's African-Americans serve as role models for students," said Oran Cox, who organized the chat series at NASA's Ames Research Center, Moffett Field, CA. "These chats will enable students to meet mentors via the Internet in a very personal way."

First-come, first-served pre-registration via the Internet is required in order for students to participate. Others can observe the conversations without registering. The Black History Month chats are sponsored by NASA's Quest Project based at Ames. There will be at least eight web chats during February.

The Black History Month chat sessions can be accessed at URL:

http://quest.arc.nasa.gov/ltc/special/mlk99/

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Chat schedule – All times EST

Feb. 2, 2:30 p.m. to 3:30 p.m.
Dr. Aprille Ericsson-Jackson, Aerospace Engineer, NASA Goddard Space Flight Center, Greenbelt, MD

Feb. 9, 12:30 p.m. to 1:30 p.m.
Janis Davis-Street, Nutritionist, NASA Johnson Space Center, Houston, TX

Feb 11, 3:00 p.m. to 4:00 p.m.
Tony Bruins, System Engineer/Integrator, Mission Operations Directorate, NASA Johnson Space Center, Houston, TX

Feb. 17, 4 p.m. to 5 p.m.
Jennifer Murray, Biomedical Engineer, NASA Kennedy Space Center, FL

Feb. 18, 4 p.m. to 5 p.m.
Janice Everett, Environmental Protection Specialist, NASA Kennedy Space Center, FL

Feb. 24, 1 p.m. to 2 p.m.
Ruth Simmons, President, Smith College, Northampton, MA

Feb. 25, 12 p.m. to 1 p.m.
Oran Cox, QuestChat Project Manager, NASA Ames Research Center, Moffett Field, CA.

Date/time to be determined for Dionne Jackson, Materials Science Engineer, NASA Kennedy Space Center, FL

Please check Quest website for late additions:

http://quest.arc.nasa.gov/ltc/special/mlk99/

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For Release

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January 25, 1999

RELEASE: 99-6

GARVER NAMED ASSOCIATE ADMINISTRATOR FOR POLICY AND PLANS

NASA Administrator Daniel S. Goldin today named Lori B. Garver as Associate Administrator for NASA's Office of Policy and Plans, effective immediately. Garver has served as acting Associate Administrator of the office since September 1998.

Garver will be responsible for agency-wide policy requirements; oversight, coordination, and direction for NASA's strategic planning and management system and NASA's history program. In addition, Garver will serve as Executive Secretary of the NASA Advisory Council.

"Lori Garver has demonstrated both the management skills and policy leadership that this position demands. Her experience both inside and outside the agency has proven invaluable for this important role, and I am pleased she has agreed to serve on a permanent basis," Goldin said.

Garver joined NASA in 1996 when she was appointed Special Assistant to the Administrator. Prior to joining NASA, she worked for the National Space Society serving as Executive Director since 1987. She is also a former president of Women in Aerospace.

Garver has received numerous awards including NASA's Distinguished Public Service Medal and the National Space Society's Space Pioneer Award.

Garver received her Masters degree in Science, Technology, and Public Policy from the George Washington University in 1989, and her Bachelors degree in Political Science and Economics from Colorado College in 1983. She resides in McLean, VA, with her husband David Brandt and their two children, Wesley, 6, and Mitchell, 4.

-end-

News Release

National Aeronautics and
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Beth Schmid
Headquarters, Washington, DC
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For Release
January 26, 1999

NOTE TO EDITORS: N99-5

NASA FY 2000 BUDGET BRIEFING SCHEDULED

A briefing on NASA's fiscal year 2000 budget request will be held on Monday, Feb. 1, 1999, at 2 p.m. EST in the NASA Headquarters auditorium, 300 E St., SW, Washington, DC.

NASA Administrator Daniel S. Goldin and NASA Comptroller Malcolm Peterson will participate in the briefing and answer questions. The briefing will be carried live on NASA TV with two-way question and answer capability for reporters covering the event from participating NASA centers. A summary of the budget request will be distributed at the beginning of the press conference. The budget request also will be available on the NASA homepage.

NASA television is on GE-2, transponder 9C, located at 85 degrees West longitude, with vertical polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz.

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For Release

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January 26, 1999

RELEASE: 99-7

FIVE EXPLORER MISSION PROPOSALS PICKED FOR FEASIBILITY STUDIES

Spacecraft that will help answer some of the biggest questions in space science have been chosen as candidates for NASA's medium-class Explorer (MIDEX) program.

The spacecraft will observe the largest explosions and brightest galaxies in the Universe; study the link between the Earth's aurora and the solar wind; search for planetary systems around 40 million stars; and investigate magnetic eruptions in the Sun's corona. The five proposals will undergo detailed study over the next five months in the first step of a two-step process. NASA will select two of the missions for flight under the MIDEX program, designed to foster lower-cost, highly focused, rapidly developed scientific spacecraft.

"Once launched, these missions will provide insights into some of the biggest questions in space science," said Dr. Ed Weiler, Associate Administrator for Space Science at NASA Headquarters. "However, MIDEX missions not only return impressive science results, they continue NASA's trend toward greatly lowering mission costs with innovative mission planning and operations."

Following detailed mission concept studies, which are due for submission by June18, 1999, NASA intends to select two of the mission proposals in September 1999 for full development as the third and fourth MIDEX flights. The two missions developed for flight will be launched in 2003 and 2004.

The selected proposals were judged to have the best science value among 35 proposals submitted to NASA in August 1998 in response to an Explorer Program Announcement of Opportunity. Each will now receive $350,000 to conduct a four month implementation feasibility study focused on cost, management, and technical plans, including educational outreach and small business involvement.

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The selected MIDEX proposals are:

* The Swift Gamma Ray Burst Explorer, a three-telescope space observatory for studying the position, brightness, and physical properties of gamma ray bursts. Although gamma ray bursts are the largest known explosions in the Universe, outshining the rest of the Universe when they explode unpredictably in distant galaxies, their underlying nature and the cause of the explosion are true mysteries of astrophysics. Swift would use its gamma ray telescope, X-ray telescope, and ultraviolet/optical telescope to determine the nature of gamma ray bursts by probing distant regions of the Universe. Swift would be led by Dr. Neil Gehrels of NASA's Goddard Space Flight Center in Greenbelt, MD, at a total mission cost to NASA of $135 million.

* The Next Generation Sky Survey (NGSS), a four-channel, supercooled infrared telescope designed to survey the entire sky with 1,000 times more sensitivity than previous missions. This infrared survey should discover millions of new cosmic sources of infrared radiation including the brightest galaxy in the Universe, the closest star to the Sun, every asteroid between Mars and Jupiter that is larger than two miles across, and protoplanetary discs in the process of forming planetary systems around nearby stars. NGSS would be led by Dr. Edward L. Wright of the University of California, Los Angeles, at a total mission cost to NASA of $139 million.

* The Full-sky Astrometric Mapping Explorer (FAME), a space telescope designed to obtain highly precise position and brightness measurements of 40 million stars. This rich database would enable numerous science investigations, including accurately determining the distance to all of the stars on this side of the Milky Way galaxy, detecting large planets and planetary systems around stars within 1,000 light years of the Sun, and measuring the amount of dark matter in the galaxy from its influence on stellar motion. FAME would be led by Dr. Kenneth J. Johnston of the U.S. Naval Observatory, Washington, DC, at a total mission cost to NASA of $138 million.

* The Auroral Multiscale Midex Mission (AMM), a formation of four identically instrumented small satellites in a near-polar, highly elliptical orbit. AMM would study the electrical connection between Earth's ionosphere and the distant magnetosphere and how that connection gives rise to the occurrence, structure, and rapid variations of the northern and southern lights. The four-satellite constellation will, for the first time, permit observations to be interpreted unambiguously in terms of variations in space or time. AMM would be led by Dr. Barry H. Mauk of the Applied Physics Laboratory, Johns Hopkins University, Laurel, MD, at a total mission cost to NASA of $130 million.

* The Advanced Solar Coronal Explorer (ASCE), a powerful solar telescope which would reveal the physical processes in the Sun that lead to the solar wind and explosive coronal mass ejections. ASCE would carry two solar instruments that are 100 times better than previous solar coronographs. It would be deployed on a recoverable satellite

from the Space Shuttle and retrieved two years later. ASCE would be led by Dr. John L. Kohl of the Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, at a total mission cost to NASA of $131 million.

NASA has also selected instruments from two proposed MIDEX missions for technology development funding. Dr. Richard Rothschild of the University of California at San Diego will develop an X-ray detector for studying black holes of all sizes. Dr. Gary Swenson of the University of Illinois at Urbana-Champaign will develop detectors for studying waves in the Earth's upper atmosphere. Both researchers will receive $700,000 over the next two years for their work.

The Explorer Program is designed to provide frequent, low-cost access to space for physics and astronomy missions with small to mid-sized spacecraft. Explorer missions are required to advance the goals and objectives of the Structure and Evolution of the Universe, Sun-Earth Connection, and Astronomical Search for Origins science themes within the Office of Space Science. The selected MIDEX science missions must be ready for launch before June 30, 2004, within the Explorer Program's NASA cost cap of $140 million. The Explorer Program is managed by NASA's Goddard Space Flight Center, Greenbelt, MD, for the Office of Space Science, Washington, DC.

- end -

News Release

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January 27, 1999

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RELEASE: 99-8

GAMMA RAY BURST IMAGED FOR FIRST TIME

Astronomers racing the clock managed to take the first-ever optical images of one of the most powerful explosions in the Universe -- a gamma ray burst -- as it was occurring on Saturday, Jan. 23, 1999. Gamma ray bursts produce more energy in a very short period than the rest of the entire Universe combined.

Because such bursts occur with no warning and typically last for just a few seconds, quick detection by orbiting spacecraft and instant notification to astronomers are critical in order to catch the bursts in the act.

The gamma-ray-burst detectors of the Burst and Transient Source Experiment (BATSE) onboard NASA's orbiting Compton Gamma Ray Observatory detected the beginning of a bright gamma ray burst. As the burst was still in progress, computers determined a rough location and radioed the position to the Gamma Ray Burst Coordinates Network (GCN), based at NASA's Goddard Space Flight Center, Greenbelt, MD. The position was immediately forwarded via the GCN to astronomers at ground based observatories throughout the world.

Just 22 seconds later the Robotic Optical Transient Search Experiment (ROTSE) in Los Alamos, NM, operated by a team led by Dr. Carl Akerlof of the University of Michigan, was in position and took images of the patch of sky where the burst was reported. Their equipment is assembled from 35 mm camera lenses and parts culled from the amateur

-more-

astronomy market. The first picture showed a brightening new star within the sky region where the burst was reported.

Five seconds later, the burst achieved peak brightness, reaching 9th magnitude, about 16 times fainter than the human eye can see, but easily visible in an amateur telescope. Within eight minutes of the initial detection, the burst had faded by a factor of 100 below its maximum brightness. "I was amazed," Akerlov said. "At best, we expected something really dim optically, at the limit of our sensitivity. Instead we found a whopper."

"If this burst had originated in the Milky Way Galaxy, it would have lit up the night sky," said Dr. Alan Bunner, Director of NASA's Structure and Evolution of the Universe science theme at NASA Headquarters.

The event was also recorded by instruments aboard the Italian-Dutch BeppoSAX satellite, which obtained a much more accurate position for the burst within a few hours of its onset. It was this more precise location information that the ROTSE team used to find the burst in their images.

"This is the Holy Grail for the Gamma Ray Burst Coordinates Network," said Dr. Scott Barthelmy, the astronomer at Goddard, who developed and runs the network. "Optical telescopes had seen the afterglow of a burst, but never the burst itself. This observation will help us understand the physical processes behind the bursting."

Within three hours of the gamma ray burst, a team of astronomers led by Dr. Stephan Odewahn, and Profs. Shri Kulkarni and George Djorgovski of the California Institute of Technology used the 60-inch Mt. Palomar telescope to find a fading optical counterpart to this gamma ray burst, helped by the precise localization provided by BeppoSAX.

The next night, a joint team led by Dr. D. Kelson of the Carnegie Institution of Washington, using the Keck II 10-meter telescope located at Mauna Kea, HI, found that the distance to the burst is about nine billion light years, more than half way to the edge of the observable Universe.

Astronomers are not certain what produces gamma ray bursts, but possible causes include the mergers of two neutron stars, two black holes, or a neutron star and a black hole, or the explosion of a so-called hypernova. A hypernova is a theorized type of supernova or exploding star.

"The optical emission was about 10,000 times brighter than ever observed, something you could see with a pair of good binoculars," said Dr. Neil Gehrels, Project Scientist of the Compton Observatory. "Theorists will have a field day trying to explain this phenomenon."

Dr. Gehrels said the simultaneous observation of the burst in optical and gamma ray energies might open the door to a whole new generation of instruments like ROTSE, which is a fully automated telescope that can respond to information about transient celestial sources instantly. Orbiting telescopes detect several hundred gamma ray bursts each year.

The ROTSE project is designed and operated by a collaboration of astrophysicists from the University of Michigan and the Department of Energy's Los Alamos and Lawrence Livermore National Laboratories. The Principal Investigator for BATSE is Dr. Gerald Fishman at NASA's Marshall Space Flight Center, Huntsville, AL. The National Science Foundation provided funding for observations at Keck II.

- end -

News Release

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For Release
February 3, 1999

RELEASE: 99-9

X-33 METALLIC HEAT SHIELD 'READY FOR FLIGHT'

Development of a low-cost space plane took a step forward last month when one of three technologies essential to its success was declared "ready for flight".

The rugged, metallic thermal-protection panels designed for NASA's X-33 technology demonstrator passed an intensive test series that included sessions in high-speed, high-temperature wind tunnels. The panels also were strapped to the bottom of a NASA F-15 aircraft and flight-tested at nearly 1.5-times the speed of sound.

Additional laboratory tests duplicated the environment the X-33's outer skin will encounter while flying roughly 60 miles high at more than 13 times the speed of sound. Also, a thermal-panel fit test successfully demonstrated the ease of panel installation and removal.

The thermal protection system combines aircraft and space-plane design, using easy-to-maintain metallic panels placed over insulating material. As the X-33 flies through the upper atmosphere, the panels will protect the vehicle from aerodynamic stress and temperatures comparable to those a reusable launch vehicle would encounter while re-entering Earth's atmosphere. Tests have verified that the metallic thermal-protection system will protect vehicles from temperatures near 1,800 degrees Fahrenheit.

"NASA is focusing on creating a next generation of reusable launch vehicles that will dramatically cut the costs associated with getting into space," said Dan Dumbacher, NASA X-33 deputy program manager. "One way to cut costs is to design rugged systems that require less maintenance and that are more airplane-like in their operations.

- more -

"By developing and proving these systems, we're creating the ability to build space planes that eventually will fly to orbit, return for servicing, and launch again as often as today's commercial airplanes make scheduled flights," he added. Dumbacher is assigned to NASA's Marshall Space Flight Center, Huntsville, AL, the lead center for developing future space transportation systems.

The remaining two technologies important for low-cost space access are an efficient propulsion system ideally suited to power a lifting body and, more importantly, lightweight-yet-strong composite cryogenic fuel tanks and structures to minimize vehicle weight. Work on those two challenging technologies continues as the X-33 program enters a phase of intense testing and qualification of the vehicle's components.

NASA expects the metallic thermal-protection panels -- developed and built by team member BFGoodrich Aerospace/Aerostructures Group in Chula Vista, CA -- to dramatically cut maintenance time and costs associated with more fragile thermal-tile systems. Because the metallic panels on the lower surfaces of the X-33 make up the vehicle's windward, aerodynamic structural shell, the system also will obtain significant weight savings over traditional thermal systems, while being much more durable and waterproof.

The X-33 is a half-scale technology demonstrator of a full-scale, commercially developed reusable launch vehicle (RLV) which Lockheed Martin has named "VentureStar", planned for development after the turn of the century. Through airplane-like operations and a single-stage-to-orbit design, a full-scale RLV could dramatically reduce the cost of putting payloads into space from $10,000 per pound to $1,000 per pound.

The X-33 is scheduled to make as many as 15 test flights from Edwards Air Force Base, CA, to Dugway Proving Ground, UT, and Malmstrom Air Force Base, MT, beginning in 2000.

Although suborbital, the X-33 will fly high enough and fast enough to encounter conditions similar to those experienced on an orbital flight path to fully prove its systems and performance.

- end -

Media Advisory

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For Release

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February 4, 1999

MEDIA ADVISORY: m99-24

SPACE STATION ASTRONAUTS TO VISIT WASHINGTON

The Space Shuttle crew that began building the International Space Station -- the brightest new star on the horizon -- will discuss working in space and perform demonstrations with a space suit and their construction tools at the National Air and Space Museum, Tuesday, February 9, beginning at 7 a.m. While in the Washington D.C. area, the crew will visit Ballou Senior High School and Children's Hospital.

The International Space Station is the largest and most complex international scientific project in history, drawing on the resources and scientific expertise of 16 nations.

Media interesting in attending the events should call the NASA public affairs officers for the Office of Space Flight at the number above for further details on the schedule and interviews.

- end -

News Release

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For Release

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February 4, 1999

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NOTE TO EDITORS: N99-6

SPACE STATION CREW RETURN VEHICLE TO TAKE FINAL TEST

NASA will conduct the second and final flight of one of the test vehicles in the X-38 Crew Return Vehicle program. The X-38 is an innovative spacecraft design planned for use as a future "lifeboat" for the International Space Station. The test will begin at approximately 11:45 a.m. EST, Friday Feb. 5. The test will be carried live on NASA TV followed by a news conference at 1 p.m. EST.

The vehicle will be released from a B-52 aircraft at approximately 22,000 feet and will fly freely for about 10 seconds before parafoils are deployed to guide it to its landing point. After Friday's test, conducted from NASA's Dryden Flight Research Center, Edwards ,CA, the vehicle will be redesigned to look like an 80 percent scale model of the eventual spacecraft.

Though the spacecraft's primary purpose would be as a "lifeboat," the design could be easily modified for other uses, such as a possible international human spacecraft that could be launched on the French Ariane 5 booster.

NASA-TV is on GE-2, transponder 9C, located at 85 degrees West longitude, with vertical polarization. Frequency will be on 3880 megahertz with audio on 6.8 megahertz.

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News Release

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For Release
February 5, 1999

NOTE TO EDITORS: N99-7

FEB. 9 UPDATE FEATURES HUBBLE'S BEST LOOK AT PLANETARY BIRTH

Dramatic new Hubble Space Telescope images of eerie edge-on disks of dust encircling young stars -- believed to be the early formative stages of planetary systems -- will be the topic of the next Space Science Update (SSU) at 1 p.m. EST, February 9, 1999.

The SSU, entitled "Dusty Disks, the Builders of Worlds," will be held at the NASA Headquarters auditorium, 300 E St. SW, Washington, DC, and will be broadcast live on NASA Television, with two-way question-and-answer capability for reporters covering the event from participating NASA centers. The panelists will discuss the latest findings and the clearest views to date of planetary construction zones.

The panelists are:

* Deborah Padgett, Staff Scientist, Infrared Processing and Analysis Center, NASA Jet Propulsion Laboratory/Caltech, Pasadena, CA
* Karl Stapelfeldt, Astronomer, Jet Propulsion Laboratory, Pasadena, CA
* Glenn Schneider, NICMOS Project Instrument Scientist, University of Arizona, Steward Observatory, Tucson, AZ
* Steven Beckwith, Director, Space Telescope Science Institute, Baltimore, MD
* Dave Leckrone, Senior Project Scientist for HST, NASA Goddard Space Flight Center, Greenbelt, MD, panel moderator.

- more -

NASA Television is broadcast on the GE2 satellite which is located on Transponder 9C, at 85 degrees West longitude, vertical polarization, frequency 3880.0 Mhz, audio 6.8 MHz. Audio of the broadcast will be available on voice circuit at the Kennedy Space Center on 407/867-1220, -1240 or -1260.

- end -

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February 4, 1999

NOTE TO EDITORS: N99-8

AEROSPACE SAFETY ADVISORY PANEL TO PRESENT REPORT TO NASA

The Aerospace Safety Advisory Panel (ASAP) will present its annual report to NASA Administrator Daniel S. Goldin at 1 p.m. EST on Thursday, Feb. 4, 1999, at NASA Headquarters. The report will be presented to the Administrator in the Program Review Center, room 9H40, NASA Headquarters, 300 E Street S.W., Washington, DC.

Each year, the panel reviews and evaluates current and future NASA programs and activities and reports its findings to the Administrator in a public session. Priority is given to programs that involve the safety of human flight.

Following the Apollo spacecraft fire on Jan. 27, 1967, Congress enacted legislation to establish the ASAP as a senior advisory committee to NASA.

The ASAP report will be available at 1 p.m. via the World Wide Web at:

http://www.hq.nasa.gov/office/codeq/codeq-1.htm

-end-

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For Release
February 8, 1999

RELEASE: 99-13

NEAR SPACECRAFT REVEALS MAJOR FEATURES OF EROS

Asteroid 433 Eros is slightly smaller than predicted, with at least two medium-sized craters, a long surface ridge and a density comparable to the Earth's crust, according to measurements from NASA's Near Earth Asteroid Rendezvous (NEAR) spacecraft.

NEAR's science instruments observed about two-thirds of Eros on Dec. 23, 1998, as the spacecraft flew by the asteroid following an unsuccessful firing of its main engine a few days earlier. A subsequent successful firing of the engine put NEAR on course to rendezvous with Eros to begin its planned yearlong orbital mission starting in mid-February 2000.

Scientists and engineers at The Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, MD, which manages the mission, and science team members from affiliated institutions quickly planned the valuable flyby observations in the wake of the unsuccessful engine burn on Dec. 20.

During the flyby, 222 photos and supporting spectral observations of Eros were taken from as close as 2,375 miles (3,830 kilometers) from the asteroid by the spacecraft's multispectral imager, infrared spectrometer and radio science experiment. "The flyby of Eros has given us fundamental information that will help us plan a better orbital mission at Eros," said Dr. Andrew F. Cheng, NEAR project scientist at APL. "It has taken some of the risk out of our orbit insertion maneuver and early operations."

First observed from the Earth more than 100 years ago, Eros was known to be an S-type asteroid with high concentrations of silicate minerals and metal. However, few details about its structure or composition are observable from the ground. The NEAR flyby produced evidence of variations in surface color and reflected light (or albedo) that suggest the asteroid has a diverse surface makeup. Closer observations during the comprehensive yearlong orbital study of Eros will be needed to determine its precise composition.

-more-

The science team has determined that Eros is slightly smaller than originally estimated from ground-based radar observations, with a size of 21 by 8 by 8 miles (33 by 13 by 13 kilometers), versus an estimate of 25.3 by 9 by 8 miles (40.5 by 14.5 by 14 km). The asteroid rotates once every 5.27 hours and has no discernible moons.

The asteroid's density is approximately 1.55 ounces per cubic inch (2.7 grams per cubic centimeter), close to the average density of Earth's crust. This makes Eros about twice as dense as asteroid 253 Mathilde, a C-type, carbon-rich asteroid that NEAR flew past in June 1997, and about the same density as S-type asteroid 243 Ida, which NASA's Galileo spacecraft flew past in 1993. Eros and Ida are the only S-type asteroids for which mass and density have been determined.

Flyby imaging of the asteroid's surface revealed a prominent elongated ridge that extends along its length for as much as 12 miles (20 km). "This ridge-like feature, combined with the measurements of high density, suggests that Eros is a homogeneous body rather than a collection of rubble" such as Mathilde appears to be, said Dr. Joseph Veverka, of Cornell University, Ithaca, NY, who heads the mission's imaging team. "It might even be a remnant of a larger body that was shattered by an impact."

The surface of Eros is pocked with craters. The two largest craters are four miles and 5.3 miles (8.5 and 6.5 km) in diameter, less than half the size of asteroid Mathilde's largest craters. The existence of fewer, smaller craters could be an indication that Eros has a relatively young surface when compared to Ida.

NEAR and Eros will cross paths again in February 2000. The spacecraft will then be inserted into orbit around the asteroid and begin its yearlong study. Images taken during orbit are expected to have more than 200 times better resolution than those obtained during the flyby and will be taken from as close as nine miles (15 km) from the asteroid's surface.

Flyby images of Eros and a related movie, an asteroid shape model and a chart of spectral observations are available on the NEAR mission Web site at:

http://near.jhuapl.edu

-end-

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February 8, 1999

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RELEASE: 99-14

PETERSEN NAMED DRYDEN DIRECTOR

NASA Administrator Daniel S. Goldin today named Kevin L. Petersen as Director of NASA's Dryden Flight Research Center, Edwards, CA. Petersen has been Acting Director of Dryden since August 1, 1998. Previously, he had served as the center's Deputy Director since January 1996.

"As Director of the Agency's premier flight research center," Goldin said, "Kevin brings to the job a wealth of aeronautical experience, expertise and leadership at Dryden. This will be absolutely essential in guiding NASA into the next century with some of the most advanced research aircraft and aviation activities in the nation."

Since joining Dryden as an aerospace engineer in 1974, Petersen's experience has included work on F-8 Digital Fly-by-wire, Highly Maneuverable Aircraft Technology (HiMAT) and X-29 forward-swept wing flight research projects. He also served as chief of the Vehicle Technology Branch and chief of the National Aerospace Plane projects office.

A graduate of Iowa State University and UCLA, Petersen received NASA's Exceptional Engineering Achievement Medal in 1985 and NASA's Exceptional Service Medal in 1987.

The Dryden Flight Research Center is chartered to conceive and conduct experimental flight research for integrated flight and propulsion controls; advanced optical sensors and controls; viscous drag reduction; advanced configurations; high-altitude, long-endurance aircraft; remotely piloted vehicle technology; hypersonic vehicle experiments; high-speed research for civil transportation; atmospheric tests of advanced rocket and air-breathing propulsion concepts; instrumentation systems; and flight loads predictions.

- end -

News Release

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RELEASE: 99-15

LAUNCH ADVISORY: SPACE SHUTTLE MANAGERS REORDER NEXT TWO FLIGHTS, SET PLANNING LAUNCH DATES FOR OTHER 1999 MISSIONS

Space Shuttle managers this week decided to reorder the next two Shuttle missions, targeting a May launch for Discovery on STS-96, the next International Space Station mission, ahead of a July launch of Columbia on STS-93, carrying the Chandra X-Ray Observatory. Planning dates also were set for missions throughout 1999.

Official launch dates are announced following the Space Shuttle Flight Readiness Review, approximately two weeks before a launch. The following target dates have been set for planning purposes:

•	STS-96 DISCOVERY	Space Station Assembly Flight 2A.1	May 20, 1999
•	STS-93 COLUMBIA	Chandra X-Ray Observatory	July 9, 1999
•	STS-99 ENDEAVOUR	Shuttle Radar Topography Mapper	Sept. 16, 1999
•	STS-101 ATLANTIS	Space Station Assembly Flight 2A.2	Oct 14, 1999
•	STS-92 DISCOVERY	Space Station Assembly Flight 3A	Dec. 2, 1999

STS-96 will be carrying interior supplies and logistics to the station in a double Spacehab module and install U.S. and Russian spacewalkers' "cranes" on the station's exterior. STS-93 will be a five-day mission to place Chandra in orbit, the third of NASA's complementary family of space-based "Great Observatories" and the largest and heaviest shuttle cargo ever. STS-99 will be a mission devoted to Earth observations using a three-dimensional imaging radar.

-more-

STS-101 will carry logistical equipment to the station and assist in outfitting and checkout of the Russian-supplied Service Module, an early station living quarters. It also will be the first flight of the Multifunction Electronic Display System, also called the "glass cockpit," a modification that has replaced many of Atlantis' cockpit instruments with computer screen displays, a technology pioneered by NASA and common aboard commercial airliners. STS-92 will carry the first exterior framework, or truss, to be attached to the station as well as a third mating adapter.

The changes in the first two flights are a result of recent delays in shipping the Chandra X-Ray Observatory from the TRW Space and Electronics Group factory in Redondo Beach, CA, to NASA's Kennedy Space Center, FL, to begin launch preparations. Work on Chandra in California has now been completed, and the observatory arrived at Kennedy on Thursday aboard an Air Force C-5 cargo aircraft. The other schedule changes allow flexibility for additional tests and prelaunch preparations for the Service Module launch.

-end-

News Release

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RELEASE: 99-16

STUDENT NAMES NASA EARTH OBSERVING SATELLITE; NASA SETS LAUNCH DATE

In a student contest to name the first in its series of Earth Observing System satellites, NASA chose 'Terra' -- in honor of our planet's mythical Mother Earth -- as the winning name. The Terra spacecraft will enable scientists to study, with unprecedented clarity, global climatic and environmental changes going into the new millennium.

In setting a launch date of July 15, 1999, for the spacecraft formerly known as "EOS AM-1," NASA's Associate Administrator for Earth Sciences, Dr. Ghassem Asrar, announced the new name after reviewing the top ten finalist essays from a contest jointly sponsored by NASA and the American Geophysical Union (AGU).

"The concept of 'Terra' uniquely conveys the themes and objectives of this important Earth science mission," Asrar said. "I congratulate Ms. Sasha Jones, a student in St. Louis, MO, for submitting the winning name and essay." Sasha's school will receive a computer and software that will enable students and teachers there to access Terra satellite imagery on the World Wide Web.

Informed that she had won the grand prize, Sasha, 17, said, "That's cool; I never won anything in my life." A senior at Brentwood High School in St. Louis, she plans to attend Western University and major in English. Her parents, Mr. and Mrs. Barry Jones, will accompany Sasha to Terra's launch, and she hopes her brother Brandon, 15, and sister Kristine, 12, can make the trip too.

-more-

In all, the international contest drew more than 1,100 entries from all 50 states and more than a dozen other countries. Members of the selection committee included top NASA and AGU officials, as well as Earth scientists and science teachers.

Terra is the flagship of NASA's Earth Observing System, a series of satellites designed to observe the Earth from the unique vantage point of space. Focused on key measurements identified by a consensus of U.S. and international scientists, Terra will enable new research into the ways that our planet's lands, oceans, air, ice and life interact as a whole climate system.

Terra is managed by NASA's Goddard Space Flight Center, Greenbelt, MD, for NASA's Office of Earth Science enterprise, Washington, DC. The AGU is an international organization of more than 35,000 scientists dedicated to advancing the understanding of Earth and its environment in space, and making the results of their research available to the public.

- end -

EDITORS NOTE: Further information, images and background materials, as well as the winning contest essay and those of the other top ten finalists, may be found on NASA's Terra Web site, at URL: **http://terra.nasa.gov**

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For Release
February 11, 1999

RELEASE: 99-17

GENERAL AVIATION TO GET A NASA-INDUSTRY 'LIFT'

In the not-too-distant future, there may be a virtual "highway in the sky," as the average person could take to the sky in small, safe and affordable, easy-to-fly personal aircraft, traveling four times the speed of today's cars.

NASA has selected a team of industry partners to help develop the highway in the sky system, a key element of the government-industry effort to revitalize general aviation in the United States.

Development costs will be shared equally between NASA and the seven-member industry team, with both contributing approximately $3 million. Team members are Avidyne Corp., Lexington, MA; AvroTec Inc., Portland, OR; Lancair, Redmond, OR; Raytheon Aircraft, Wichita, KS; Rockwell Collins, Cedar Rapids, IA; Seagull Technologies, Los Gatos, CA; and AlliedSignal, Olathe, KS.

The team, with AvroTec as team lead and Avidyne as technical project manager, has 2 1/2 years to complete hardware and software development of a totally new concept for presenting critical, flight-path guidance information to the pilot.

Dubbed "highway in the sky," the cockpit display system includes a computer-drawn highway that the pilot follows to a preprogrammed destination. The highway is drawn on a highly intuitive, low-cost flat panel display -- the primary flight display of the future -- that will displace decades-old "steam gauge" instrumentation.

The system also includes a multi-function display of position navigation, terrain map, weather and air traffic information. In addition, digital (datalink) radios will send and

-more-

receive flight data, and a solid-state attitude and heading reference system will replace gyroscopes.

Together, the displays and other equipment will provide intuitive situational awareness and enough information for a pilot to perform safely, with reduced workload, in nearly all weather conditions.

In addition to transforming cockpits, the technology developed by the team will redefine the relationship between pilots and air traffic control and fundamentally change the way future general aviation pilots fly. This technology is expected to significantly increase freedom, safety and ease-of-flying by providing pilots with affordable, direct access to information needed for future "free-flight" air traffic control systems. Pilots will have the ability to safely determine their routes, speeds and proximity to dangerous weather, terrain and other airplanes.

The team will work toward flight certification of the highway in the sky system around the year 2001. This will be the first attempt to certify such a system using affordable commercial "off-the-shelf" computer technology in aircraft.

Development of the highway in the sky system has been fostered by the Advanced General Aviation Transports Experiment (AGATE) -- a consortium of more than 70 members from industry, universities, the Federal Aviation Administration and other government agencies. All seven highway in the sky team members are AGATE members.

AGATE was created by NASA in 1994 to develop affordable new technology -- as well as industry standards and certification methods -- for airframe, cockpit, flight training systems and airspace infrastructure for next-generation single pilot, four-to-six seat, near all-weather light airplanes.

Along with a parallel program -- the General Aviation Propulsion program for development of revolutionary engines -- AGATE is providing industry partners with technologies leading to a small aircraft transportation system in the early 21st century. These investments support the national general aviation "roadmap" goal to "enable doorstep-to-destination travel at four times highway speeds to virtually all of the nation's suburban, rural and remote communities."

- end -

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RELEASE: 99-18

GUIDONI TO ACCOMPANY FIRST ITALIAN SPACE STATION ELEMENT TO ORBIT

European Space Agency Astronaut Umberto Guidoni, Ph.D., will be on board Discovery when it delivers one of the Italian Space Agency's (ASI) contributions to the International Space Station on a mission targeted for April 2000. NASA Administrator Daniel S. Goldin made this announcement in Rome, Italy, earlier this week.

Guidoni is the first astronaut named to Shuttle flight STS-102, which will carry one of three multi-purpose logistics modules (MPLMs) scheduled for launch to the International Space Station. Named "Leonardo," the 21 foot-long, 15-foot wide module was built by ASI under a bilateral agreement with NASA that included a flight opportunity for an Italian astronaut for the first MPLM mission.

Leonardo can carry up to 10 tons of cargo housed in standard space station equipment racks. For this flight, Leonardo will carry equipment and supplies to outfit the U. S. laboratory module, "Destiny," which is scheduled for a March 2000 launch. Leonardo, and its follow-on modules Raffaello and Donatello, is designed to support dual functions, initially carrying cargo to orbit and then serving as on-orbit Space Station modules.

Guidoni has one previous Shuttle mission to his credit. He flew as a payload specialist on board STS-75 in 1996. During that 16-day mission, he and six other astronauts supported numerous experiments comprising the United States Microgravity Payload, and also demonstrated the ability of the NASA/ASI's Tethered Satellite System to generate electricity.

The remaining crew members will be named at a later date. For information on Guidoni, or any astronaut, see the NASA Internet biography home page at URL: http://www.jsc.nasa.gov/Bios/

- end -

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For Release
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RELEASE: 99-19

COSMONAUTS NAMED TO STS-96 AND STS-101

Three Russian cosmonauts with experience and expertise in the Russian Service Module and Zarya will join 1999 Space Shuttle missions to visit the International Space Station.

Valery Ivanovich Tokarev (Colonel, Russian Air Force) has been named to the STS-96 mission, the first logistics flight to the International Space Station. This second mission to the space station will bring supplies to be used by the next assembly mission that will connect Russia's Service Module to the Zarya. Tokarev replaces Yuri Ivanovich Malenchenko (Colonel, Russian Air Force) who was previously assigned to this mission and is now assigned to STS-101.

Tokarev, a Russian cosmonaut and Air Force test pilot, has been a commander of cosmonauts of aerospace systems at the Yuri A. Gagarin Cosmonaut Training Center. He is a graduate of the Yuri A. Gagarin Air Force Academy and has a master's degree in State Administration. He will join STS-96 Commander Kent Rominger, Pilot Rick Husband and crew members Ellen Ochoa, Tamara E. Jernigan, Daniel T. Barry, and Canadian Space Agency astronaut Julie Payette.

Russian Cosmonauts Malenchenko and Boris W. Morukov (M.D., Ph.D.) have been assigned to STS-101, the second logistics flight to the International Space Station. Other crew members on STS-101 are Commander James D. Halsell Jr., Pilot Scott J. Horowitz, and crew members Mary Ellen Weber, Edward Tsang Lu, and Jeffery N. Williams.

Malenchenko, a Russian Air Force pilot and Commander of an aviation unit, flew in space for 126 days as commander of the 16th basic expedition to Mir. He is a graduate of N.Ye.Zhukov Military Air Engineering Academy and the Kharkov Higher Military Aviation Academy for Pilots.

- more -

Morukov, a doctoral graduate in medicine from the 2nd Moscow Medical Institute and doctoral graduate in space medicine from the Institute for Biomedical Problems, has held a number of significant positions at the Institute for Biomedical Problems prior to attending basic space training at Gagarin Cosmonaut Training Center and becoming a Cosmonaut-Researcher.

- end -

News Release

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For Release

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March 1, 1999

RELEASE: 99-20

NASA ADMINISTRATOR APPOINTS DANIEL C. TAM SPECIAL ASSISTANT FOR COMMERCIALIZATION

NASA Administrator Daniel S. Goldin has appointed Daniel C. Tam to be Assistant to the Administrator for Commercialization, effective Feb. 28. Tam will be a NASA Headquarters employee based at NASA's Jet Propulsion Laboratory, Pasadena, CA.

In his new position, Tam will be charged with aggressively seeking opportunities to increase commercialization of NASA infrastructure, operations and technology. He will also be reaching out to the broader public sectors, including industry, academia and other government organizations, to accelerate the deployment of NASA-developed technologies in the U.S. economy beyond the aerospace sector.

"Dan Tam brings a unique blend of government and commercial experience to this challenging position," said Goldin. "He has applied his engineering and business expertise to solve both agency and industry problems. More importantly, he knows what it takes to make a business successful and how to get something done in a government agency. He will be a strong advocate for commercial approaches and commercial outcomes at NASA and will help grow America's commercial space business. I am pleased he has agreed to return to NASA to help focus the Agency's energies on this important task."

Tam most recently has been the Director of Planning and Investments for TRW's Space and Electronics Group. He has managed strategic and operations planning as well as the resource management of this $2 billion high-tech company. In more than 20 years with TRW, Tam has also held management positions for contracts, acquisitions and finance and supported many of its complex national security and civilian space systems.

Before rejoining TRW, Tam was NASA's deputy project manager for the International Space Station from 1994 to 1997. In that position, he was responsible for the business and financial requirements of the program, including information systems and cost and schedule control.

-more-

Tam earned bachelor's degrees in mechanical engineering and economics from the University of California-Davis in 1972. He received his master's degree in economics from the University of California-Davis in 1973 and a master of business administration degree from UCLA in 1975.

-end-

News Release

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For Release
February 22, 1999

RELEASE: 99-24

MARS GLOBAL SURVEYOR READY TO BEGIN FULL MAPPING

NASA's Mars Global Surveyor spacecraft will begin its primary mapping mission within the next two weeks, following a successful firing of its main engine on Feb. 19 to fine-tune its path around the red planet into a nearly circular, Sun-synchronous orbit.

The final "transfer to mapping orbit" burn lowered Global Surveyor's closest approach over Mars from 253 miles (405 kilometers) to approximately 229 miles (367 kilometers). Later this week, the flight team will turn on, focus and calibrate the spacecraft's camera and power up several other science instruments, including the thermal emission spectrometer and laser altimeter.

"Reaching our mapping orbit has been a long time coming for all involved. We are delighted to finally be able to do this mission as it was designed, in the proper mapping orbit with all the instruments working at their full potential," said Dr. Arden Albee, the Mars Global Surveyor project scientist at the California Institute of Technology, Pasadena, CA.

The mapping orbit was designed so that Surveyor passes over a given part of Mars at the same local time each orbit. At about 2 p.m. local Mars time, the spacecraft will cross the equator flying northward on the daytime side and about 2 a.m., it will cross the equator flying southward on the nighttime side. This timing is essential for effective interpretation of atmospheric and surface measurements, because it allows scientists to separate local daily variations from longer-term seasonal and annual trends.

"We still have a few minor adjustments to fine-tune the orbit during the next few weeks. Our plan at this point is to conduct the first three one-week mapping cycles with Surveyor's high-gain communication antenna in the stowed position. After we have these first mapping cycles completed, we plan to deploy the antenna and continue mapping in that configuration," said Glenn E. Cunningham, deputy director of the Mars Exploration Program at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

-more-

Launched in November 1996 and in Mars orbit since September 1997, Mars Global Surveyor carries a dish-shaped high-gain antenna that will be deployed on a 6.6-foot-long boom. The antenna was stowed during launch and the early orbital phase at Mars to reduce the chances of its being contaminated by the exhaust plume from the spacecraft's main engine.

During deployment, the boom is pushed outward by a powerful spring. A damper mechanism cushions the force of the spring and limits the speed of the deployment, somewhat like an automobile shock absorber or the piston-like automatic closer on a screen door. Last year, engineers became aware of problems with similar damper devices on deployable structures such as solar panels on other spacecraft.

"Until we deploy the antenna, we must turn the entire spacecraft periodically to transmit data to Earth," Cunningham explained. "This means that we have to stop acquiring science data. The advantage of deploying the high-gain antenna is that we can then use its gimbals to point the antenna at Earth and send science data back at the same time the instruments are pointed at Mars."

The first phase of the primary mapping mission is scheduled to begin on March 8. The deployment of high gain antenna is currently scheduled for March 29, pending approval by NASA Headquarters officials in mid-March.

Mars Global Surveyor is the first mission in a long-term program of Mars exploration known as the Mars Surveyor Program that is managed by JPL for NASA's Office of Space Science, Washington, DC. JPL's industrial partner is Lockheed Martin Astronautics, Denver, CO, which developed and operates the spacecraft. JPL is a division of the California Institute of Technology.

Further information about the mission, including a link to the "Top 10" images of Mars returned by Global Surveyor so far, is available on the Internet at:

http://mars.jpl.nasa.gov/mgs/index.html

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For Release

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February 23, 1999

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RELEASE: 99-25

WIDE-FIELD INFRARED EXPLORER TO SURVEY STARBURST GALAXIES

One of NASA's smallest spacecraft, scheduled for launch March 1, will tackle a very big cosmic question: What is the history of star-formation in the Universe?

NASA's first new spacecraft in the Origins Program, the Wide-Field Infrared Explorer (WIRE), is scheduled for launch at 10 p.m. EST on March 1 from Vandenberg Air Force Base (AFB), CA.

The four-month mission will help understand how and when galaxies formed, and the subsequent history of star-formation in the Universe. Answers to these questions will shed a strong light on the very nature of the Universe.

"In many ways this inaugural mission of NASA's Origins Program, which will study the birth of star-forming galaxies, will move us towards our ultimate goals," said Dr. Harley Thronson, acting director of the Astronomical Search for Origins science theme at NASA Headquarters, Washington, DC. "One of the Origins Program's long-term goals is to understand the formation of not only the Universe, but the galaxies and stars we see everywhere in the cosmos. WIRE will provide us with a wealth of information, which will get us closer to understanding how the Universe could reach the point of forming Sun-like stars and Earth-like planets. And, WIRE will do that at a very modest cost."

- more -

"Our science team will measure how densely filled the Universe has been with star-forming galaxies during its history, and how quickly those galaxies have been forming stars," said WIRE Principal Investigator Perry Hacking of Vanguard Research, Inc., Fairfax, VA; NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA; and a professor at El Camino College, Torrance, CA. "WIRE also will conduct a search for powerful, dusty quasars in the very early Universe, shortly after the Big Bang. If found in significant numbers, these quasars will carry strong implications about the age and structure of our Universe."

Additional WIRE science investigations will include detailed inventories of some star-forming regions in our own Milky Way galaxy; searches for small, substellar objects called 'methane dwarfs,' which are essentially more massive versions of the planet Jupiter; searches of nearby stars for leftover debris from planet formation; a more complete inventory of the asteroid belt, and much more.

The 561-pound (254-kg) spacecraft will be launched from Vandenberg AFB on a Pegasus-XL launch vehicle built by Orbital Sciences Corporation. The launch vehicle is a three-stage, solid-propellant booster system carried aloft by a Lockheed L-1011 jet aircraft. The system will be released when the aircraft reaches an altitude of about 40,000 feet (12,200 meters).

The WIRE instrument consists of a 12.5-inch (30-centimeter) aperture Cassegrain telescope with no moving parts and a field of view about the size of the full moon. The telescope is enclosed within a two-stage, state-of-the-art, solid-hydrogen cryostat, which will keep the instrument's mirrors cooled to below -436 F. The cryostat is designed like a thermos bottle, using a vacuum space between layers of insulation, and uses the sublimation (the direct transition from a solid to a gas) of frozen hydrogen to cool the telescope. The telescope must be cold so that its own heat emission doesn't overwhelm the light that it is trying to detect from space.

The WIRE observatory will be inserted into an orbit with an altitude of 340 miles (540 km) above the Earth, and will orbit the Earth every 90 minutes. The observed data will be stored in the spacecraft memory and sent to ground stations at Poker Flat, AL, and NASA's Wallops Flight Facility, VA. From there the data will be sent to the spacecraft control center at NASA's Goddard Space Flight Center, Greenbelt, MD, and then on to the science operations center at the Infrared Processing and Analysis Center (IPAC), California Institute of Technology, Pasadena, for data calibration and analysis. The WIRE teaming partner is Space Dynamics Laboratory at Utah State University, Logan, UT.

WIRE is the last of an initial series of Small Explorers (SMEX) that have been designed and built at Goddard. The Small Explorer office has provided the mission, spacecraft, and ground system engineering and the principal investigator has provided the scientific instrumentation for these missions.

The WIRE observatory was integrated into a three-axis-stabilized spacecraft designed, built, and tested by the SMEX Project Team at Goddard. The telescope assembly is provided to Goddard by JPL. After an initial checkout period of thirty days on orbit, scientific operations will be coordinated by JPL through the science operations center at IPAC.

The SMEX program provides frequent flight opportunities for highly focused, relatively inexpensive and small space science missions. Each mission is cost-capped for design, development, and operations through the first 30 days in orbit. Using modern technology and management techniques, the program is dedicated to the forty-year Explorer Program tradition of service to the space science community.

"The Small Explorer program has produced remarkable results," said Jim Watzin, Project Manager for SMEX. The SMEX program already has four spacecraft (SAMPEX, FAST, SWAS and TRACE) successfully operating on-orbit. "All were completed on schedule and within or below the program cost constraints," he said. "All missions differed dramatically from each other in form, function, and scope. WIRE will be the fifth and final mission developed in this manner." Future SMEX missions are to be built at the institution chosen by the principal investigator.

The WIRE Project website is located at:
http://sunland.gsfc.nasa.gov/smex/wire/

The WIRE science website is located at:
http://www.ipac.caltech.edu/wire/

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February 24, 1999

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RELEASE: 99-26

SPACE SHUTTLE DEVELOPMENT CONFERENCE SET FOR JUNE; NATIONAL FORUM TO FOCUS ON SHUTTLE OF THE FUTURE

NASA and Space Shuttle prime contractor United Space Alliance will hold a national conference June 10-11 to identify emerging technologies and system concepts as candidates for next-generation upgrades to the Space Shuttle. The first annual Space Shuttle Development Conference will be held at the South Shore Harbour Conference Center in League City, TX.

The conference will feature new technology demonstrations, advanced system concepts and design proposals for Space Shuttle avionics, propulsion, power, ground systems and major element configurations.

"Since it was first designed, the Shuttle has continuously evolved, taking advantage of new technology when possible to increase safety, reduce cost and enhance its capabilities. We need to ensure that it continues this evolution and remains ready to meet the requirements in space for this country well into the 21st century," Space Shuttle Program Manager Tommy Holloway said. "We want this conference to be a forum for ideas that will help us meet that goal. We anticipate that it will lead to opportunities for NASA and industry to invest in developments that will continue the Shuttle's evolution toward an even safer, more reliable and more affordable future.

"Even with the achievements it has amassed during the past 17 years, so far the Space Shuttle has only flown for about a quarter of the lifetime for which it was originally designed," Holloway added. "Today, it remains the most reliable launch vehicle in the world, and its capabilities in orbit are unmatched as it begins assembly of the International Space Station."

-more-

In addition to candidate technologies and systems, next-generation missions for the Shuttle will be presented and discussed, including research, technology testing, satellite retrieval and refueling, and vehicle assembly in orbit.

"Nothing in existence can match the capabilities of the Space Shuttle in orbit," said United Space Alliance Shuttle Development Director Andrew Allen. "As next generation vehicles are being developed, it is imperative that we continue to evolve and improve the overall system and assure its availability to support human operations aboard the space station and to meet the needs of the new millennium."

Organizations interested in submitting proposals, exhibits, or technology demonstrations should contact United Space Alliance at 281/212-6222. Registration materials for the conference will be available beginning March 12 by mail and via the USA web site at: **www.unitedspacealliance.com**

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For Release
February 25, 1999

RELEASE: 99-27

ROBOTIC ROVER, SPACESUITED GEOLOGIST WORK TOGETHER IN TEST OF FUTURE EXPLORATION

NASA is testing a remotely operated planetary rover and an advanced prototype spacesuit in southern California this week to see how robots and humans might someday work best together to explore other planets.

A team of scientists and engineers from NASA's Ames Research Center (ARC), Moffett Field, CA, and Johnson Space Center (JSC), Houston, TX, is conducting the first field test involving the Russian-built Marsokhod and a geologist wearing a NASA advanced prototype spacesuit. Dubbed the Astronaut-Rover Interaction for Planetary Surface Exploration (ASRO) experiment, the four-day primary science mission was conducted Feb. 22-25 in the Mojave Desert, east of Los Angeles; a public demonstration will be held on Feb. 27.

The rover activity is led by Ames, while JSC provided the spacesuit, visual-tracking software, and associated human space exploration expertise. Together, the team hopes to develop a synergistic relationship between the two explorers.

"We want to obtain a preliminary assessment of human interaction with a rover for future planetary exploration, and find out how they can best help each other," explained ASRO Project Science Leader Dr. Nathalie Cabrol of Ames. "We want to be ready when it is time to start human surface exploration on other planets."

"NASA envisions future planetary surface spacewalks to be a cooperative effort, with robots assisting humans to increase productivity during these time-limited excursions away from the base station," said Robert Yowell of the Extravehicular Activity Projects Office at JSC.

- more -

The ASRO Project should improve the safety and performance of human surface operations, and therefore help minimize the cost of human planetary missions. Specifically, the team hopes to learn how the rover and the astronauts can collaborate in various operational tasks, leading to recommendations for improving the designs of future advanced spacesuits and rovers.

"The test is part of a continuing NASA effort to better identify the challenges facing future human explorers of other worlds, and the technologies that will be needed to meet those challenges," explained Joyce Carpenter, Deputy Manager of the JSC Exploration Office. "While we are in the early stages of learning how to explore other planets, NASA has not identified any specific human missions beyond Earth's orbit."

NASA acquired the Marsokhod rover from Russia and equipped it with improved avionics, computers and science instruments. It features six titanium wheels, a robotic arm to pick up soil samples and stereo video cameras mounted on a pan-and-tilt platform to transmit live images of the field test via a satellite back to scientists at Ames. The 165-pound (75-kilogram) rover is three feet (one meter) wide and 4.5 feet (1.5 meters) long, with a mast that extends about 4.5 feet high to hold the cameras.

The spacesuit is constructed primarily of fabric, with ball bearings that allow the wearer to move more easily when the suit is inflated to 3.75 pounds per square inch above the local pressure, as it would be on the Moon or Mars. A self-contained liquid air backpack provides life support, cooling, communications and power. The suit and backpack have a weight of about 150 pounds (68 kilograms) on Earth.

JSC geologist Dean Eppler wore the spacesuit during the test. The Marsokhod served as a scout and videographer, transmitting advance images of the site and the geologist's activities back to Ames and JSC. The rover is equipped with JSC-developed software that should allow it to automatically track the human explorer's progress and move in response. In addition, the rover was designed to assist the astronaut by documenting science targets, and carrying rock samples and spacewalking tools.

Although the field tests are not open to the public, project scientists plan to showcase the Marsokhod rover and the new spacesuit during a public demonstration following the science mission. The demonstration will be conducted in cooperation with the Bureau of Land Management on Saturday, Feb. 27, from 10 a.m. to 4 p.m. PST at the Barstow High School stadium, First and Campus Way, Barstow, CA. For more information about the public demonstration, please contact Gina Robison at the Bureau of Land Management at 760/252-6000.

Information about the Barstow school can be found on the school's web site: **http://www.barstow.k12.ca.us/bhs/** The public web site for the Marsokhod field test is located at: **http://quest.arc.nasa.gov/ltc/special/mars/**

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News Release

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February 26, 1999

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RELEASE: 99-28

X-34 ARRIVES AT NASA DRYDEN FOR TESTS

The X-34 technology-testbed demonstrator, structural test article arrived at NASA's Dryden Flight Research Center, Edwards, CA, Feb. 24, for ground testing and Federal Aviation Administration (FAA) certification of its L-1011 mothership.

The structural test article consists of the X-34's airframe. It was shipped from Orbital Sciences Corporation's facilities in Dulles, VA, in two separate trucks -- one for the fuselage and another for the wing. The first vehicle will be assembled at Dryden before undergoing ground vibration tests, which ensure that there are no potentially hazardous vibrations during flight. The L-1011 will undergo ground vibration tests as well, both alone and mated to the X-34.

"We are excited to be part of the X-34 team. We are pleased to be able to make a contribution to this project that adds to Dryden's legacy in test flight," Dryden X-34 project manager Dave Bushman said.

Once ground tests are complete, the X-34 will make six or seven captive-carry flights mated to the L-1011. This will allow the FAA to approve modifications made to the L-1011 to enable it to carry the X-34, a much larger vehicle than the L-1011's normal Pegasus Launch Vehicle payload.

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Certification flights will take place in Edwards Air Force Base, CA, airspace with Dryden providing hangar space, fuel and control room facilities.

Once certified, a separate X-34 flight vehicle will be transported to the U.S. Army's White Sands Missile Range, NM, where the first portion of the planned 27 flight tests will be conducted. Once the X-34 has demonstrated safe and reliable performance at White Sands, the project plans to move to NASA's Kennedy Space Center, FL, for the remainder of the test flights.

The X-34 is a single-engine rocket with short wings and a small tail surface. The vehicle is 58.3 feet long, 27.7 feet wide at wing tip and 11.5 feet tall from the bottom of the fuselage to the top of the tail.

Plans call for the reusable X-34 to fly at a rate of 25 times per year. The autonomously operated, suborbital aerospace vehicle will be air-launched from an L-1011. Capable of flying eight times the speed of sound and reaching an altitude of 250,000 feet, the X-34 will demonstrate low-cost reusability, autonomous landing, subsonic flights through inclement weather, safe abort conditions and landing in 20-knot cross winds.

The X-34 is designed to bridge the gap between the earlier Clipper Graham, or DC-XA subsonic demonstrator vehicle, and the larger, more advanced X-33 vehicle. The X-34 project is part of NASA's Office of Aero-Space Technology, which oversees NASA's efforts to develop the technology to dramatically reduce the cost of access to space.

Key technologies being demonstrated by the X-34 include composite primary and secondary airframe structures; composite reusable propellant tanks, cryo insulation and propulsion system elements; advanced Thermal Protection Systems and materials; low-cost avionics, including differential Global Positioning System and Inertial Navigation System; integrated vehicle health monitoring system; flush air data system; and automated vehicle checkout. The X-34 also will have the potential to serve as a platform for demonstration of additional technologies and experiments.

The X-34 will be powered by the Fastrac engine, which is currently in design and development at NASA's Marshall Space Flight Center, Huntsville, AL. Fastrac is a single-stage main engine, which burns a mixture of liquid oxygen (LOX) and kerosene (RP-1).

Six NASA centers, two Department of Defense installations and an industry team led by prime contractor Orbital Sciences Corp. are supporting the development and eventual flight testing of the X-34. The program is managed for NASA by Marshall.

-end-

News Release

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March 1, 1999

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RELEASE: 99-29

NASA ANNOUNCES FIELD CENTER NAME CHANGE

NASA Administrator Daniel S. Goldin today officially changed the name of the Lewis Research Center, Cleveland, OH, to the John H. Glenn Research Center at Lewis Field.

"I cannot think of a better way to pay tribute to two of Ohio's famous names -- one an aeronautic researcher and the other an astronaut legend and lawmaker -- than by naming a NASA research center after them," said Goldin.

U.S. Senator Mike DeWine (R-OH) proposed the name change in the FY 1999 VA-HUD Appropriations Bill last October in recognition of Glenn's contributions to science and space, and to the State of Ohio.

"We are honored that the center will now bear the name of two great men, John Glenn and George Lewis," said Center Director Donald J. Campbell. "The blending of names reflects the pioneering research in aerospace technology that employees have performed throughout the center's history, and will continue to perform in the future."

The research facility, built in 1941, was named for George William Lewis, research director for the National Advisory Committee for Aeronautics, soon after his death in 1948. On Oct. 1, 1958, the name was modified from Lewis Flight Propulsion Laboratory to Lewis Research Center to reflect its becoming part of the new National Aeronautics and Space Administration.

Glenn, a native of Ohio, became the first American to orbit the Earth in 1962. As one of the original seven Mercury astronauts, Glenn trained at Lewis in the Multiple Axis Space Test Inertia Facility (MASTIF), also known as the Gimbal Rig. Astronauts were strapped into the MASTIF to learn how to bring a capsule tumbling in space under control.

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In 1998, after serving four terms as a U.S. Senator, Glenn again made history as the oldest astronaut to fly in space as a crew member on the STS-95 mission. During the mission, he served as a test subject for investigations that explored the similarities between aging on Earth and in the microgravity environment of space.

The Glenn Research Center is one of ten NASA centers located across the country. The research and technology development work conducted at the center focuses on aeronautical propulsion, space propulsion, space power, satellite communications and microgravity sciences in combustion and fluid physics.

Over 2100 civil service employees and 1500 on-site support-service contractors carry out its work. The center consists of 24 major facilities and over 500 specialized research facilities at the 350-acre Cleveland site, next to Cleveland Hopkins International Airport, and the 6400-acre Plum Brook Station in Sandusky, OH. Further information on the Glenn center can be found on the Internet at:

http://www.grc.nasa.gov

- end -

News Release

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For Release

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March 2, 1999

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RELEASE: 99-30

NASA WILL STUDY IDEAS TO TRANSFORM EARTH OBSERVATIONS

NASA's New Millennium program has selected four concepts for further study as candidates for its Earth Observing 3 (EO-3) mission, technologies that could revolutionize space-based Earth observations, according to Dr. Ghassem Asrar, NASA's Associate Administrator for Earth Science. Each concept is designed to test innovative approaches for observing Earth's surface and atmosphere from positions outside low-Earth orbits, with an emphasis on advanced measurement technologies.

The primary goal of the New Millennium program is to identify, develop and validate key instrument and spacecraft technologies that can lower cost and increase performance of science missions in the 21st century.

"The technologies under consideration for these missions will revolutionize space-based Earth observations, due to their unique spatial, spectral and temporal characteristics, and capture aspects not previously possible of the Earth's dynamic atmosphere," said Asrar.

The selected concepts are:

- Active large aperture optical systems to provide high resolution thermal imaging from geosynchronous orbit, proposed by Del Jenstrom, manager of Advanced Geosynchronous Studies at NASA's Goddard Space Flight Center, Greenbelt, MD, which will lead this study.

- Geostationary synthetic aperture microwave sounder, proposed by Dr. Bjorn Lambrigtsen, a senior member of the technical staff in the Earth and Planetary Atmospheres Research Element at NASA's Jet Propulsion Laboratory, Pasadena, CA, which will lead this study.

-more-

- Geostationary imaging Fourier transforming spectrometer, proposed by Dr. William L. Smith, chief of the Atmospheric Science Division at NASA's Langley Research Center, Hampton, VA, which will lead the study.

- Geostationary tropospheric trace-gas imager, proposed by Dr. Jack Fishman, a member of the Atmospheric Science Division of the Langley Research Center. Dr. Fishman will work with Dr. James F. Gleason, a member of the Laboratory of Atmospheres at Goddard, with Langley leading the study.

These concepts were selected from 24 proposals submitted in response to a NASA Research Announcement released in September 1997. The selection process included evaluations of each proposal by external science and technology peer reviewers, along with two panel sessions with leading NASA scientists and technologists to categorize each proposal.

Each of the concept providers is responsible for forming a team to conduct a six-month study effort, at the end of which they will each produce peer-reviewed study reports. At least one will be selected by the Office of Earth Science to enter the full implementation phase. Final selection is targeted for September 1999.

The first New Millennium program Earth-orbiting mission, Earth Observing-1 (EO-1), is scheduled for launch in December 1999. It will demonstrate an advanced land imager system and hyperspectral imaging technologies that may eventually replace the current measurement approach used by Landsat satellites. Further information about EO-1 is available at URL:

http://eo1.gsfc.nasa.gov/NUwww/miscPages/home.html

Earth Observing-2 will fly an infrared laser in the cargo bay of the Space Shuttle to demonstrate the capabilities of a space-based lidar to accurately measure atmospheric winds from the Earth's surface to a height of about ten miles. This flight is scheduled for launch in early 2001. Details are available at URL:

http://wwwghcc.msfc.nasa.gov/sparcle/

The New Millennium program is managed by NASA's Jet Propulsion Laboratory, for NASA's Office of Space Science and Office of Earth Science, Washington, DC. Further information about the New Millennium program is available at URL:

http://nmp.jpl.nasa.gov/

-end-

News Release

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For Release
March 3, 1999

RELEASE: 99-31

NASA BEGINS TESTING REPLICA OF HISTORIC 1903 WRIGHT FLYER

NASA is conducting a wind tunnel test of a full-scale replica of the historic 1903 Wright Flyer this month to learn more about its stability, control and handling characteristics.

During the two-week test, March 1-14, project engineers will study the replica's stability, control and handling at speeds up to 30 mph. Tests are being conducted at NASA's Ames Research Center, Moffett Field, CA, in the world's largest wind tunnel. Test results will be used to compile a historically accurate aerodynamic database of the Wright Flyer.

"I can't think of anything as exciting as using modern technology to test an aerodynamic replica of the biplane that Orville and Wilbur Wright flew for the first time in 1903 at Kitty Hawk," said Pete Zell, Ames' wind tunnel test manager. "NASA is here as a resource for the public and to inspire young people. This project seeks to educate and inspire youth," Zell said.

"Testing the Wright Flyer gives us a chance to re-live history," said Craig Hange, Ames' wind tunnel test engineer. "By understanding the flying characteristics of the Wright Flyer, we gain a better understanding of the Wright brothers' science and engineering skills, as well as an appreciation of the process that led to the development of the airplanes we fly today."

A team of volunteers from the Los Angeles section of the American Institute of Aeronautics and Astronautics (AIAA) built the replica using precise data from the original airplane provided by the Smithsonian. The replica features a 40-foot-4-inch wingspan reinforced with piano wire, cotton wing coverings, spruce propellers and a double rudder. Although it will replicate the 1903 Wright Flyer in design, size, appearance and aerodynamics, some changes have been made to strengthen the airplane for the wind tunnel tests.

Upon completion of the tests, the replica will be transported to Los Angeles, where it will be permanently displayed in the lobby of the Federal Aviation Administration's (FAA) Western Pacific Regional Office in Hawthorne, CA. The lobby will be renamed the FAA Flight Deck Museum and include a variety of other exhibits depicting the history of aviation.

-more-

Using the wind tunnel test data, a second Wright Flyer will be built by the AIAA volunteers and flown on Dec. 17, 2003, commemorating the 100th anniversary flight of Orville and Wilbur Wright at Kitty Hawk, NC. During a re-creation of the Wright brothers' first flight, the aircraft will fly low and travel at only 30 mph, the same speed flown by the Wright brothers, whose first flight traveled only 120 feet during its 12 seconds in the air. Fred Culick, 63, of Altadena, CA, a private pilot and an aeronautics professor at the California Institute of Technology, Pasadena, CA, will be the first to fly the airplane.

Orville and Wilbur Wright were responsible for a host of aviation inventions, including wing warping, which provides lateral control and allows an airplane to bank left or right. They also invented the forward stabilizer, which controls the airplane's up and down movement, and the moveable rear rudder, which enables the pilot to turn the aircraft.

"The work of the Wright brothers founded the science and technology of aeronautics, and their accomplishments form one of the grandest chapters in history," said Jack Cherne, TRW engineer and chairman of the Wright Flyer Project. The project is composed of volunteers from the Los Angeles Section of the AIAA. In contrast to the Wright brothers, who took less than a year to build their biplane, AIAA volunteers spent their Saturdays for the past 18 years planning and assembling the replica.

The replica underwent special tests as a prerequisite for entering the NASA wind tunnel. During static testing, more than three times the flight load (or more than 3,000 pounds) was applied successfully. The replica also underwent tests of its propeller system at Able Corp. in Yorba Linda, CA. In the NASA wind tunnel, the replica will be powered by a NASA electric motor.

The replica has about $100,000 worth of donated materials from companies such as Northrop Corp./Aircraft Division, Torrance, CA, which also provided the project a home base for 15 years; International Die Casting, Gardena, CA; McDonnell Douglas, Long Beach, CA; Rockwell International, Downey, CA; and TRW Redondo Beach, CA.

Biographies, live Internet webcasts, K-12 lesson plans and more test information are available at the NASA Quest website located at:
http://quest.arc.nasa.gov/aero/wright/

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News Release

National Aeronautics and
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Washington, DC 20546
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For Release

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March 4, 1999

Lori Rachul
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RELEASE: 99-32

CAMPBELL NAMED LABORATORY DIRECTOR OF THE YEAR

NASA's Glenn Research Center Director Donald J. Campbell has been named the 1998 Laboratory Director of the Year by the Federal Laboratory Consortium (FLC) for Technology Transfer.

The award, presented by the consortium annually, honors laboratory directors who have made exemplary contributions to the overall enhancement of technology transfer for economic development. Campbell will receive the award on April 21, 1999, at the organization's 25th anniversary national meeting in Salt Lake City, UT.

"I'm honored to have been chosen to receive this award," said Campbell. "I believe the technologies developed at Glenn are leading-edge and can be used to improve the quality of life and provide meaningful return on taxpayers' dollars. I accept the award on behalf of the center's employees who work so diligently in transferring their technologies for commercial applications."

Campbell, NASA's first African-American center director, was selected to receive the award in recognition of his successful efforts to broaden the commercialization of Glenn's technologies. In the last five years, at least 20 new products have been created due to Glenn-developed technologies.

Under Campbell's leadership, the Lewis Incubator for Technology was established to help entrepreneurs and start-up companies gain financial and marketing assistance as they commercialize NASA-developed technologies. In addition, the newly created Garrett Morgan Commercialization Initiative helps to increase the competitiveness of small businesses and small disadvantaged businesses in Ohio and the Great Lakes region through the use of NASA technologies.

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Campbell also has been instrumental in providing a hands-on educational experience to African-American and Hispanic students each year through the Science, Engineering, Mathematics and Aerospace Academy (SEMAA). The program, a collaborative effort between Glenn and Cuyahoga Community College, Cleveland, OH, has proven to be extremely successful. Since its inception, SEMAA has been replicated twice, with plans for seven additional sites in major cities.

"I'm very happy to be able to recognize Don Campbell's contributions to technology transfer and support for the FLC," said Dr. Jagdish Mathur, principal scientist, Marconi Aerospace and chairman, National Advisory Group, FLC. "Don is an outstanding and dedicated individual who has demonstrated leadership and personal commitment to work with American industry and the community for economic development and growth. His efforts have made a difference."

More than 600 of the largest federal government research laboratories and centers, representing 16 federal departments and agencies, are presently members of the FLC. The mission of the FLC is to promote and facilitate the rapid movement of federal laboratory research results and technologies into the mainstream of the U.S. economy.

Campbell is a native of Lima, OH. He earned a bachelor's degree at Ohio Northern University and a master's degree at Ohio State University, both in mechanical engineering. He holds honorary doctorate degrees from Wilberforce University and Ohio Northern University. He is also a member of the Tau Beta Pi Engineering Honorary Society.

NOTE TO EDITORS: A photo of Mr. Campbell is available by calling NASA Headquarters at 202/358-1900 or the Glenn Research Center at 216/433-8806.

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News Release

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For Release
March 4, 1999

RELEASE: 99-33

**NASA RESEARCHERS DOCUMENT
SHRINKING OF GREENLAND'S GLACIERS**

Greenland's southeastern glaciers are rapidly thinning and their lower elevations may be particularly sensitive to potential climate changes, a NASA study suggests.

"The results of this study are important in that they could represent the first indication of an increase in the speed of outlet glaciers," said Bill Krabill, principal investigator at NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, VA. An outlet glacier acts as a major ice drainage region for an ice sheet.

"The excess volume of ice transported by these glaciers has had a negligible effect on global sea level thus far, but if it accelerates or becomes more widespread, it would begin to have a detectable impact on sea level," Krabill said.

In the March 5 issue of SCIENCE, researchers report the glacial thinning is too large to have resulted from increased ice-surface melting or decreased snowfall. The researchers believe the thinning, as much as 30 feet over five years in some locations, is the result of increasing discharge speeds of glaciers flowing into the Atlantic Ocean.

Krabill said surface-melt water might be seeping to the bottom of glaciers. Such seepage may be reducing the friction between the ice and the rock below it, enabling the glaciers to slide with less friction across the bedrock and thus allow more ice to slip off into the ocean, according to Krabill.

"The results of this study are significant because they provide the first evidence of widespread thinning of low-elevation parts of one of the great polar ice sheets. The results also suggest that the thinning outlet glaciers must be flowing faster than necessary to remove the annual accumulation of snow within their basins," said Krabill.

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"Why they are behaving like this is a mystery," said Krabill, "but it might indicate that the coastal margins of ice sheets are capable of responding quite rapidly to external changes, such as a potential warming of the climate."

Researchers noted that while some internal areas of Greenland that were surveyed showed ice thickening, areas along the coast showed ice thinning. "Taken as a whole, the surveyed region is in negative balance," Krabill said.

In 1993 and 1994, NASA researchers surveyed the Greenland ice sheet using an airborne laser altimeter flown on a NASA P-3 aircraft and measured the thickness of the entire ice sheet. Ten flight lines flown in 1993 in Southern Greenland were resurveyed in 1998. The flight lines in Northern Greenland flown in 1994 will be resurveyed in May 1999. Throughout the study, pilots have used the Global Positioning System and other navigational equipment to fly the same flight path some 400 meters above the icy surface.

The results showed three areas in the South accumulating at rates up to ten inches per year. These areas located in the internal sections of Greenland are in regions of high snowfall.

In the outer regions of the ice sheets, the researchers reported large areas of thinning, with the rate of thinning increasing rapidly towards the ocean. Most-rapid thinning rates (more than three feet per year) were observed in the lower depths of East-coast outlet glaciers, the researchers reported.

The researchers noted that the areas of thinning in the East also saw warmer than normal temperatures for 1993 to 1998. "However, we also observe areas of thinning near the West coast, where many locations were cooler than normal," the researchers reported.

These surveys have established baseline data sets that will be extended with information from NASA's ICESAT spacecraft. The ICESAT satellite laser altimeter will be launched in 2001 to measure ice-surface elevations in Greenland and Antarctica.

Further information on the Greenland mapping project, including the technology behind the science, can be found on the web at:

http://aol.wff.nasa.gov/aoltm.html

The Office of Earth Science enterprise, NASA Headquarters, Washington, DC, sponsors the Greenland and Antarctic ice mapping projects as part of NASA's ongoing efforts to understand the total Earth system and the effects of natural and human-induced changes on the global environment.

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News Release

National Aeronautics and
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For Release

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March 5, 1999

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RELEASE: 99-34

NASA WORKING TO CORRECT SPIN RATE OF WIRE SPACECRAFT

Ground controllers are attempting to recover a NASA spacecraft that was unable to maintain a stable position in orbit after launch Thursday.

The Wide-Field Infrared Explorer (WIRE) spacecraft began to experience a problem during its second pass over a ground station, following a successful launch at 9:57 p.m. EST from Vandenberg Air Force Base, CA. The Poker Flats, AK, ground station determined that WIRE was still spinning instead of maintaining a stable position in orbit and was warmer than expected. The WIRE team has declared a spacecraft emergency and is communicating with the spacecraft while attempting to slow the spin rate and cool the WIRE spacecraft.

"Recovery of the spacecraft is our top priority," said Ken Ledbetter, Director of the Mission and Payload Development Division in the Office of Space Science at NASA Headquarters, Washington, DC. "The spacecraft carries frozen hydrogen to cool its instrument, and we believe that the hydrogen is venting as it warms up, causing the spacecraft to spin. However, at this time, spacecraft controllers do not know what specifically caused the situation."

A spacecraft recovery team has been formed, headed by David Everett of NASA's Goddard Space Flight Center, Greenbelt, MD. In addition to the recovery team, an anomaly investigation board is being formed.

Further updates will be released as information concerning WIRE's anomaly is obtained.

- end -

News Release

National Aeronautics and
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For Release
March 8, 1999

NOTE TO EDITORS: N99-14

NASA TO COMMEMORATE SPACELAB: A BRIDGE TO THE FUTURE

NASA is sponsoring a forum highlighting the history and science accomplishments of the Spacelab series of Space Shuttle missions, which took place from 1981 – 1998. The forum will be held March 10-11, 1999, at the National Research Council, 2100 C Street, NW, Washington, DC.

Spacelab, a pressurized, cylindrical facility carried in the Shuttle's payload bay, provided scientists with a platform for conducting research in a laboratory environment 180 miles above the Earth.

The forum also will celebrate Spacelab's role in the evolution of space-based research toward a permanent presence in space. Charles Walker, three-time Shuttle payload specialist, will deliver an address entitled "Mercury, Skylab, Spacehab, International Space Station: A Continuum" at 5 p.m. on March 10. Following the presentation, NASA Administrator Daniel Goldin will serve as the keynote speaker at a reception in the Great Hall of the National Research Council at 5:30 p.m.

NASA, industry and university researchers will discuss Spacelab's contributions to a broad range of space-based research, including microgravity effects, genetics, human physiology, combustion, gravitational biology, protein crystal growth and commercial research. Participants include:

- Dr. Kenneth Baldwin, University of California at Irvine
- Dr. Arthur Davidsen, Johns Hopkins University, Baltimore, MD
- Dr. Lawrence DeLucas, University of Alabama at Birmingham
- Dr. David Larson, State University of New York at Stoney Brook
- Dr. Arnauld Nicogossian, NASA Headquarters, Washington, DC
- Dr. Simon Ostrach, Case Western University, Cleveland, OH
- Dr. David Robertson, Vanderbilt University, Nashville, TN
- Mr. Joseph Rothenberg, NASA Headquarters, Washington, DC
- Dr. Lawrence Young, Massachusetts Institute of Technology

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Researchers will be available for interviews during the conference. To schedule an interview, please contact Renee Juhans at 202/358-1712. Media representatives are required to register for the conference; when registering, please indicate that you are **Media**. For more information, go to:

http://www.hq.nasa.gov/office/olmsa/spacelab.html

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News Release

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For Release
March 8, 1999

RELEASE: 99-36

"ROCKET BOY" HOMER HICKHAM HIGHLIGHTS MARCH 24 SYMPOSIUM

The public is invited to hear renowned panelists -- including Homer Hickham, the subject of the new movie, "October Sky," -- debating humanity's destiny in the cosmos, and see a controversial meteorite containing evidence of possible life on Mars at the "Space Exploration at the Millennium" symposium. The symposium will take place at American University's Bender Arena in Washington, DC, Wednesday, March 24, from 8:30 a.m. - 9:40 p.m.

In remembrance of Carl Sagan and as part of NASA's 40th anniversary celebration, the event will include a variety of panel discussions and exhibits. Former and current astronauts will explore the risks and rewards of human exploration, and director of the Planetary Society Lou Friedman and Ann Druyan, wife of the late Carl Sagan, will talk about his legacy. NASA Administrator Daniel S. Goldin will be on an evening panel addressing space exploration for a new generation.

Among the many NASA exhibits on display are Moon and Mars rocks; an extravehicular space suit demonstration; an exhibit explaining the missions to assemble and inhabit the International Space Station; and the Mars Pathfinder engineering model used to test the actual spacecraft that landed on Mars.

The event is free and open to media representatives and the public. On-line registration for the event is available at:

www.space2000org

and schedule information for the program panels is available at:

http://www.SPACE2000.org/program.htm

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A listing of all the exhibits is available at:

http://www.SPACE2000.org/exhibits.htm

A map and directions to American University can be found at:

www.american.edu/media/maps.htm

The symposium will be broadcast on NASA Television located on GE-2, transponder 9C, located at 85 degrees West longitude, with vertical polarization. Frequency will be on 3880.0 megahertz, with audio on 6.8 megahertz. The TV schedule corresponds with the program panel schedule to be found at:

http://www.SPACE2000.org/program.htm

The symposium is sponsored by American University, NASA, the DC Space Grant Consortium and the American Astronautical Society.

-end-

News Release

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For Release
March 8, 1999

RELEASE: 99-37

WIRE SCIENCE INSTRUMENT RUNS OUT OF HYDROGEN

Ground controllers are slowly gaining control of NASA's Wide-Field Infrared Explorer (WIRE), but the entire supply of frozen hydrogen needed to cool its primary scientific instrument has been released into space, ending the scientific mission of the spacecraft.

"We are very disappointed at the loss of WIRE's science program," said Dr. Ed Weiler, NASA's Associate Administrator for Space Science at NASA Headquarters, Washington, DC. "We are establishing a formal anomaly investigation board to find out what happened, which will help us to plan future missions. I'm confident that many of the scientific goals can be accomplished by upcoming missions such as the Space Infrared Telescope Facility, so it will be science delayed rather than science lost."

Spacecraft controllers believe the primary telescope cover was released about three days earlier than planned. As a result sunlight began to fall on the instrument's cryostat, a container of frozen hydrogen designed to cool the instrument. The hydrogen then warmed up and vented into space at a much higher rate than it was designed to do, causing the spacecraft to spin. Controllers do not know what specifically caused the cover to be released.

WIRE's primary instrument is a 30-centimeter aperture (12.5-inch) Cassegrain telescope enclosed inside a solid hydrogen cryostat. The cryostat was designed to cool the telescope's inner workings to –430 degrees F -- cold enough so that the telescope's own heat emissions would not mask the infrared light that it is trying to detect in space.

By early Saturday, the spacecraft's rate of spin had stabilized at about 60 revolutions per minute, giving controllers hope they could start the painstaking process of regaining control of the 563-pound spacecraft. On Saturday, ground controllers developed and uploaded a new computer program to WIRE that began imparting small, countering forces using the satellite's onboard magnetic attitude control system to gently slow the spacecraft's spin.

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Controllers have been successfully using this approach to slowly regain control of the spacecraft and reduce the spin rate approximately 3 degrees per second per orbit. WIRE is now rotating about 250 degrees per second. The objective is to reduce the spin rate sufficiently that the onboard system will take over and provide full attitude control. Controllers are hopeful this will be accomplished by the end of this week.

"The spacecraft was never designed to be controlled in this manner," said Jim Watzin, Small Explorer Project Manager, "so it's slow, tedious work. I'm confident by week's end we will have WIRE in a stable configuration, available for any analysis deemed appropriate."

WIRE was launched March 4 at 9:57 p.m. EST from Vandenberg Air Force Base, CA. When the spacecraft made its second pass over one of the WIRE tracking stations, ground controllers determined that WIRE was spinning instead of maintaining a stable position in orbit, and temperatures for the cryostat and the instrument were warmer than expected.

After the anomaly investigation board completes its work with WIRE, engineers plan to use the spacecraft as an engineering testbed to evaluate advanced attitude control systems, communications, and data handling and operations.

- end -

News Release

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For Release

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March 11, 1999

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RELEASE: 99-39

SPACE RESEARCH MAY ACCELERATE DEVELOPMENT OF FLU FIGHTING DRUG

A NASA-industry team has used the results of Space Shuttle experiments to develop a new flu drug that may decrease the length and severity of the illness and even prevent the development of symptoms in those exposed to the virus.

"With NASA support for space and ground-based research, we successfully mapped the molecular structure of the influenza virus," said Dr. Larry DeLucas, director of the Center for Macromolecular Crystallography at the University of Alabama at Birmingham. "The mapping exposed the virus' weaknesses in greater detail and our industrial partners were able to develop a drug that exploits those weaknesses."

Dr. Ming Luo, a professor at the Center for Macromolecular Crystallography, and an international team of crystallographers developed the "molecular map" of the flu virus from space grown protein crystals. The map was used to design drugs that block the undesirable characteristics of the virus.

"It's like trying to build a tiny key that fits into a tiny lock," said DeLucas. "Except this lock is living, breathing, flexing, changing temperatures and in constant motion."

Pure, precisely ordered protein crystals of large size and uniformity are in high demand by drug developers. When grown on the ground, protein crystals often cannot be grown as large or as well-ordered as researchers desire, obscuring vital pathways to a better understanding of disease. The "frequent flyers" of the space program, protein crystal growth experiments are aboard nearly every Space Shuttle mission, helping researchers unlock the secrets of how to stop infection and disease on Earth.

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Influenza protein crystals flown aboard the Space Shuttle in May 1996 were used to confirm earlier studies and to determine the effectiveness of potential drugs on the flu virus protein.

"By analyzing space-grown crystals of the influenza virus, we were able to get a clearer picture of the virus' structure," said DeLucas. "NASA's support for this research project probably saved considerable time needed to develop this new drug."

The flu virus infects 20 to 40 million people in the United States each year, even with vaccines, and thousands are at risk of dying from its complications.

The new drug, part of a new class of medicines called neuraminidase inhibitors, was developed in a partnership between NASA and the Center for Macromolecular Crystallography. The new compound was synthesized by BioCryst Pharmaceuticals in Birmingham, AL, and is under development by The R.W. Johnson Pharmaceutical Research Institute, Raritan, NJ, a Johnson & Johnson Company.

Sponsored by the Space Product Development Office, Microgravity Research Program, at NASA's Marshall Space Flight Center, Huntsville, AL, DeLucas' organization is chartered as a NASA Commercial Space Center -- encouraging private industry to benefit from space technology.

Neuraminidase inhibitors are designed to block an active site of influenza neuraminidase, an enzyme associated with the spread of the flu. Unlike vaccines, which have to be taken before exposure and are only specific to certain strains of the influenza virus, a neuraminidase inhibitor may be taken as either treatment or prevention, and is effective against a wide variety of influenza strains.

The R.W. Johnson Pharmaceutical Research Institute is responsible for all phases of testing the drug in humans. Before becoming available in the United States, the drug must undergo this testing and be approved by the Food and Drug Administration.

- end -

Note to Editors: Interviews are available with NASA, industry and university researchers by contacting Steve Roy at NASA's Marshall Space Flight Center Media Relations Office at (256) 544-6535.

More information about NASA's Microgravity Research Program experiments can be found at:

http://www.msfc.nasa.gov/news
http://microgravity.msfc.nasa.gov

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For Release

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March 11, 1999

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RELEASE: 99-40

NASA SEEKS PROPOSALS FOR ADVANCED RADAR TECHNOLOGY

NASA is seeking proposals for a low-cost, advanced imaging radar technology that will reduce the cost and enhance the performance of Earth observing satellites -- opening new opportunities for the U.S. commercial remote-sensing industry.

The Lightweight Synthetic Aperture mission, or "LightSAR," is part of NASA's long-term effort in the development and productive use of imaging radars. Past NASA radar missions, which have been short in duration, have established the potential of imaging radar to expand scientific knowledge of Earth and the planets.

The satellite's capability to observe the Earth day and night in all weather is expected to result in numerous scientifically valuable and commercially lucrative applications. For example, LightSAR will have the unique capability to continuously monitor minute changes in the Earth's surface, down to the one-millimeter level, which will lead to improved understanding of natural hazards such as earthquakes and volcanoes.

The satellite's advanced capabilities also will greatly help improve governments' emergency management efforts and may prove useful to industries involved in disaster recovery. Other applications of the satellite will include observing the movements and changing size of glaciers and ice floes as part of long-term Earth climate studies. Forest regrowth and global vegetation maps produced by LightSAR will support NASA's on-going studies of the Earth's environment.

LightSAR's high-resolution imaging capability has significant commercial potential for mapping the Earth's surface, environmental surveillance, crop monitoring and land management, planning and development. One of the unique features of this NASA

-more-

program will be to encourage proposers to share the costs of developing and deploying the satellite's capabilities in return for commercial rights to data.

Proposals for mission development and operations using LightSAR are being sought from many organizations, including educational institutions, industry, nonprofit institutions, NASA field centers, federally funded research and development centers and other government agencies. The LightSAR announcement of opportunity is available via the Internet at URL:

http://www.earth.nasa.gov/nra/current/

Proposals must be submitted by May 10, 1999. A pre-proposal conference will be held from 9 a.m. to 3 p.m. EST March 18 at the Crystal City Sheraton Hotel, Arlington, VA. Further information about the LightSAR mission is available from Richard M. Monson, NASA's associate director for exploratory missions, at 202/358-3552, or via email to: oesresponse@hq.nasa.gov.

NASA's Jet Propulsion Laboratory, Pasadena, CA, is managing the LightSAR project for NASA's Office of Earth Science, Washington, DC, which oversees a long-term, coordinated research enterprise designed to study Earth as a global environmental system.

- end -

Contract Announcement

National Aeronautics and
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Washington, DC 20546
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For Release

March 12, 1999

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Ed Campion
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RELEASE: C99-a

ALLIEDSIGNAL WINS CONTRACT FOR NASA'S WHITE SANDS FACILITY

NASA's Johnson Space Center, Houston, TX, has awarded a contract to AlliedSignal Technical Services Corp., Columbia, MD, for testing, evaluation and maintenance services for the center's White Sands Test Facility in Las Cruces, NM. Major subcontractors to AlliedSignal are L&M Technologies, Inc. and Lynx, Ltd.

The potential value of the contract, including award fees based on performance, is estimated at $324 million. The contract effort will be divided into a two-year base period and three options for additional one-, two- and two-year periods sequentially.

The services to be provided under the contract will include:

- propulsion system and material/component test and evaluation;
- technical core support services such as precision cleaning, calibration and flight hardware fabrication;
- test systems and facility maintenance and operation; and
- general and administrative services such as technical editing, logistics and security.

- end -

News Release

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For Release

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March 12, 1999

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Release 99-41

SHUTTLE VETERANS COMPLETE HUBBLE SERVICING CREW

NASA has named two veteran astronauts and a first-time flyer to the crew that will pay an early visit to the Hubble Space Telescope this October. Four experienced space walkers already have been training for the mission, designated STS-103, a nine-day flight to service and maintain the Hubble Space Telescope.

Commander Curtis L. Brown, Pilot Scott J. Kelly and European Space Agency (ESA) astronaut Jean-François Clervoy will join space walkers Steven L. Smith, C. Michael Foale, John M. Grunsfeld and ESA astronaut Claude Nicollier.

NASA officials decided to move up part of the servicing mission that had been scheduled for June 2000 after three of the telescope's six gyroscopes failed. Three gyroscopes must be working to meet the telescope's very precise pointing requirements, and the telescope's flight rules dictated that NASA consider a "call-up" mission before a fourth gyroscope failed. Having fewer than three working gyroscopes would preclude science observations, although the telescope would remain safely in orbit until a servicing crew arrived.

STS-103 will be Brown's sixth shuttle mission, his third as commander. Brown, a lieutenant colonel in the U.S. Air Force, commanded last year's STS-95 mission and STS-85 in 1997. He also served as pilot on STS-77 in 1996, STS-66 in 1994, and STS-47 in 1992.

Kelly, a member of the 1996 Astronaut Candidate class, will be a first-time space traveler. A lieutenant commander in the U.S. Navy, he reported to NASA in April 1996, completing two years of training to qualify for assignment as a Shuttle pilot.

- more -

Clervoy will be making his third flight. As a mission specialist on STS-66, he used the Shuttle's robot arm to deploy the CRISTA-SPAS atmospheric satellite. On STS-84 in 1997, he visited the Russian Mir Space Station.

The four mission specialists already in training include Payload Commander Steve Smith, a veteran of two space flights. Smith brings extensive Hubble servicing experience to the crew, having performed three space walks on Hubble servicing mission STS-82 in 1997.

Foale is a veteran of four space flights, including a long-term stay aboard Mir, and 10.5 hours of space walking. He also serves as the Assistant Director (Technical) of NASA's Johnson Space Center, Houston, TX, reporting to the center director.

A veteran of two flights, Grunsfeld served on STS-67 in 1995, the second Shuttle flight of the Astro observatory, and STS-81 in 1997, the fifth mission to Mir.

Nicollier, an ESA astronaut, is another veteran of Hubble servicing, having flown on STS-61 in 1993, the first servicing mission. He flew two other Shuttle missions in 1992 and 1996.

For complete biographical information on the STS-103 crew, or any astronaut, see the NASA Internet biography home page at URL:

http://www.jsc.nasa.gov/Bios/

- end -

News Release

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For Release
March 12, 1999

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RELEASE: 99-42

NASA SELECTS TOP INVENTIONS OF THE YEAR

The inventor of a device that helps stabilize NASA spacecraft has been selected to receive the NASA Government Inventor of the Year Award. The NASA selection committee also chose a high temperature resin material to receive the NASA Commercial Invention of the Year.

Inventor Charles E. Clagett, a Goddard Space Flight Center, Greenbelt, MD, employee and Associate Head of the Component and Hardware Systems Branch at Goddard, received the honor for the "Apparatus for Providing Torque and for Storing Momentum Energy."

"Being selected the NASA government inventor of the year is really a surprise, an honor, and quite a shock," said Clagett. "I appreciate the fact that I have been recognized for my invention."

Commonly known as the SMEX Reaction/Momentum Wheel, the device was developed for NASA's Small Explorer program (SMEX). A compact mechanism was needed that could accelerate at a high rate with little vibration to fulfill the missions' science requirements. The wheel's compact design is durable with at least a four-year life expectancy while providing improved performance and better stability for a spacecraft, and significantly reducing vibration.

This reaction wheel invention has been highly successful on the last two Small Explorer missions, the Transition Region and Coronal Explorer and the Submillimeter Wave

-more-

Astronomy Satellite. The high acceleration rate and low vibration device allows detection of signals that would have been obscured by previous reaction wheels, thus enabling Goddard to support missions that previous technology could not support.

NASA's Commercial Invention of the Year goes to Langley Research Center's nominated PETI-5, short for "Phenylethynyl Terminated Imide Oligomers," fifth composition. This material can be used both as a glue that holds fibers together and as an adhesive in a variety of aerospace and commercial applications. Langley inventors Paul Hergenrother, Joseph Smith and Brian Jensen were awarded three patents on the novel material.

PETI-5 was originally developed for high-speed, high-temperature aircraft applications because it is strong and lightweight. Its exceptional combination of properties has attracted the interest of U.S. industry. PETI-5 products are now commercially available and have resulted in about $10 million in sales.

To date, NASA has licensed PETI-5 technology to four companies. Designers and manufacturers like PETI-5 because it is easy to process into complex parts and because of its mechanical properties, durability, non-toxicity and ability to adjust to changing environments. In the future, PETI-5 may be applied to consumer products like high-performance automobile engines.

The inventors will be honored at a NASA Headquarters ceremony where they will receive an award check and certificate.

- end -

News Release

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For Release
March 22, 1999

NOTE TO EDITORS: N99-15

NASA INSTITUTE WILL 'STRETCH' IMAGINATIONS MARCH 25 AND 26

The first annual meeting of the NASA Institute for Advanced Concepts (NIAC) on March 25 will be followed by a Universities Space Research Association/NIAC technical symposium, "Grand Visions of Aerospace -- The Next 30 Years," on March 26. Both sessions, and the press availability immediately following, will take place at NASA Headquarters in Washington, DC.

The meetings will be held in NASA's James E. Webb Memorial Auditorium, west lobby, 300 E Street SW. Registration will be held from 8 to 8:30 a.m. both days; the proceedings will begin at 8:30 a.m.

The March 25 annual meeting is the first status report on the 16 Phase I grants awarded by the NIAC in November 1998. The topics range from advanced transportation and propulsion systems to revolutionary systems for exploring planets and the cosmos. Each currently funded NIAC Phase I grant recipient will present a technical status summary of his or her advanced concept.

At the March 26 technical symposium, six leaders in space and aeronautics will examine the challenges and possibilities for revolutionary advances to affect the direction of aeronautical and space development for the next 30 years.

"These presentations are aimed at stretching our imagination decades into the future," said Dr. Robert A. Cassanova, the Institute's director. "We hope that this symposium will provide the spark to ignite an explosion of revolutionary ideas to address the grand challenges of aeronautics and space advancement."

-more-

Presenting at the symposium will be:

- Dr. Mark R. Abbott, Professor, College of Oceanic and Atmospheric Sciences, Oregon State University
- Dr. Peter J. Denning, Professor of Computer Science, George Mason University
- Dr. George Donahue, FAA Visiting Professor for Air Transportation Technology and Policy, George Mason University
- Dr. Jerry Grey, Director of Aerospace and Science Policy, American Institute of Aeronautics and Astronautics
- Dr. Wesley T. Huntress, Director, Geophysical Laboratory, Carnegie Institute of Washington
- Dr. Laurence Young, Apollo Program Professor of Astronautics, Massachusetts Institute of Technology

Both meetings are open to the public, and members of the news media are invited to attend. To ensure reserved seating, media representatives should call Sarah Keegan, NASA Headquarters Public Affairs, at 202/358-1902. General seating will be available for walk-ins.

At 12:30 p.m. March 26, immediately following the symposium, NASA's Chief Technologist Samuel L. Venneri; Dr. Michael Francis, President of Athena Technologies; Mr. Gentry Lee, science fiction author; and Dr. Cassanova will give additional remarks. Dr. Cassanova and symposium speakers will take questions from media representatives and be available for interviews.

The complete agendas for the annual meeting and technical symposium and biographies of the symposium speakers can be found under "What's New" on the NIAC web site at:

http://www.niac.usra.edu/

The NIAC is funded through NASA's Office of the Chief Technologist. NASA awarded a $10.9 million contract to the Universities Space Research Association in February 1998 to establish and manage the NASA Institute for Advanced Concepts. Through a series of open solicitations over the life of the contract, the NIAC will seek proposals from the science and engineering community to develop revolutionary, advanced concepts in aeronautics and space. NASA's Goddard Space Flight Center, Greenbelt, MD, supplies NASA oversight and coordination of NASA systems engineering analysis and technical assistance, administrative support and conference facility support.

-end-

News Release

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March 25, 1999

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RELEASE: 99-46

NASA EXPERIMENT LAYS GROUNDWORK FOR 'LIVING OFF THE LAND' ON MARS

NASA engineers have succeeded in a realm often left to alchemists and magicians -- creating something valuable "out of thin air." In this case, the thin air was a simulated Martian atmosphere, and the valuable commodity was oxygen.

"The concept is to use the resources on Mars to reduce the amount of material that needs to accompany a human mission . . . to 'live off the land,' " said Principal Investigator David Kaplan of the Exploration Office at NASA's Johnson Space Center. "Producing oxygen using materials readily available on Mars would be an important step toward reducing the costs and risks of an eventual human mission to Mars."

This week's demonstration is an initial test of technology that will be aboard the Mars Surveyor 2001 Lander, scheduled to launch April 10, 2001, and land on Mars on January 22, 2002. Called the Mars In-Situ Propellant Production Precursor, the experiment will test the feasibility of using the thin Martian atmosphere to produce oxygen for breathing air and propellants. Propellants created on Mars could eventually be used to send samples and astronauts back to Earth.

"The oxygen production technology being tested this week is based on sound, straightforward chemistry," said Jerry Sanders of Johnson's Propulsion and Fluid Systems Branch.

-more-

The primary test involves an experimental device inside a Mars environment chamber that selectively absorbs carbon dioxide from a simulated Martian atmosphere - called "Mars mix" -- and converts it to oxygen. This technology also may be used to extract pure oxygen from Earth air for home, medical and military needs.

The atmosphere inside the experiment chamber simulates Martian temperatures and atmospheric pressures. The "Mars mix" is 95 percent carbon dioxide, thin (almost 150 times thinner than Earth's atmosphere) and cold (-105 degrees Fahrenheit, or -75 degrees Centigrade, like a typical Martian night).

The mix provides the feedstock for the chemical reaction. A wafer-thin, solid-oxide ceramic disk made of zirconia, about the size of a small cookie, is sandwiched between two platinum electrodes and heated to 1,380 degrees Fahrenheit (750 degrees Centigrade). When carbon dioxide is fed to this unit, the zirconia cell "cracks" the carbon dioxide into carbon monoxide and oxygen. Only the oxygen can penetrate through to the other side of the disk; the carbon dioxide and carbon monoxide gases are stopped in their tracks.

The Mars Surveyor 2001 Lander is expected to provide essential insights into how to conduct successful, cost-effective human missions to Mars. The lander's primary science goal is to explore the mineralogy of the landing site, near the Martian equator, by taking visible and infrared pictures of the surrounding terrain and deploying a rover similar to Mars Pathfinder's Sojourner. Other equipment will analyze the Martian soil and surface radiation.

The Mars In-Situ Propellant Production Precursor demonstration is part of Johnson's continuing effort to identify solutions to the challenges facing future human explorers of other worlds. The Johnson Space Center is NASA's lead center for the Human Exploration and Development of Space enterprise.

Mars Surveyor 2001 is part of the Mars Surveyor Program, a long-term program of Mars exploration managed by the Jet Propulsion Laboratory for NASA's Office of Space Science, Washington, D.C. The laboratory is a division of the California Institute of Technology, Pasadena, CA. For more information about the Mars Surveyor 2001 mission, visit:

http://mars.jpl.nasa.gov/2001/

- end -

News Release

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For Release
March 26, 1999

NOTE TO EDITORS: N99-16

LOOKING TOWARD HOME: NASA BRIEFING ON LANDSAT 7 MISSION

Reviewing 27 years of environmental discovery and previewing new ways of looking at our world, NASA and the U.S. Geological Survey will brief reporters this week on the April launch of Landsat 7.

The last in a series that began with the Landsat 1 in 1972, Landsat 7 will gather data from Earth's land surface and surrounding coastal regions. Analysis of the data will provide scientists with new information on deforestation, receding glaciers and crop monitoring. The data also will be available commercially for land-use planning and urban development issues.

The briefing will be held at 1 p.m. EST March 31 in the James E. Webb Memorial Auditorium at NASA Headquarters, 300 E St., SW, Washington, DC. The spacecraft is scheduled for launch on April 15 from Vandenberg Air Force Base, CA, atop a Delta II rocket. After the satellite has been launched and checked out, NASA will turn it over to the Geological Survey to manage.

At the briefing, officials from NASA and the U.S. Geological Survey will review some of the notable successes of the Landsat program and outline Landsat 7's mission. Scientists have used Landsat data to study the effects of the Mount St. Helens eruption, deforestation in the Amazon and urban growth in Washington, DC, and Shanghai. NASA officials also will preview upcoming events in NASA's Earth Science program, including this year's launch of the first Earth Observing System satellite.

The briefing will be carried live on NASA TV with two-way question-and-answer capability for reporters at NASA centers. NASA Television is broadcast on the GE2 satellite located on transponder 9C, at 85 degrees West longitude, frequency 3880.0 Mhz, audio 6.8 MHz.

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News Release

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March 29, 1999

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RELEASE: 99-47

HUGE SPRING STORMS ROUSE URANUS FROM WINTER HIBERNATION

If springtime on Earth were anything like it will be on Uranus, we would be experiencing waves of massive storms, each one covering the country from Kansas to New York, with temperatures of 300 degrees below zero.

A dramatic new time-lapse movie by NASA's Hubble Space Telescope shows for the first time seasonal changes on the planet. Once considered one of the blander-looking planets, Uranus is now revealed as a dynamic world with the brightest clouds in the outer Solar System and a fragile ring system that wobbles like an unbalanced wagon wheel. The clouds are probably made of crystals of methane, which condense as warm bubbles of gas well up from deep in the atmosphere of Uranus.

The movie, created by Hubble researcher Erich Karkoschka of the University of Arizona, clearly shows for the first time the wobble in the ring system, which is made of billions of tiny pebbles. This wobble may be caused by Uranus' shape, which is like a slightly flattened globe, along with the gravitational tug from its many moons.

Although Uranus has been observed for more than 200 years, "no one has ever seen this view in the modern era of astronomy because of the long year of Uranus -- more than 84 Earth years," said Dr. Heidi Hammel, Massachusetts Institute of Technology.

-more-

The seasonal changes on Earth are caused by our planet's rotational pole being slightly tilted. Consequently, the Earth's Southern and Northern hemispheres are alternately tipped toward or away from the Sun as the Earth moves around its orbit.
Uranus is tilted completely over on its side, giving rise to extreme 20-year-long seasons and unusual weather. For nearly a quarter of the Uranian year, the sun shines directly over each pole, leaving the other half of the planet plunged into a long, dark, frigid winter.

The Northern Hemisphere of Uranus is just now coming out of the grip of its decades-long winter. As the sunlight reaches some latitudes, it warms the atmosphere. This appears to be causing the atmosphere to come out of a frigid hibernation and stir back to life.
Uranus does not have a solid surface, but is instead a ball of mostly hydrogen and helium. Absorption of red light by methane in the atmosphere gives the planet its cyan color.

Uranus was discovered March 13, 1781, by William Herschel. Early visual observers reported Jupiter-like cloud belts on the planet, but when NASA's Voyager 2 flew by in 1986, Uranus appeared as featureless as a cue ball. In the past 13 years, the planet has moved far enough along its orbit for the sun to shine at mid-latitudes in the Northern Hemisphere. By the year 2007, the sun will be shining directly over Uranus' equator.

Karkoschka, Hammel and other investigators used Hubble from 1994 through 1998 to take images of Uranus in both visible and near-infrared light.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. for NASA, under contract with NASA's Goddard Space Flight Center, Greenbelt, MD. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

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NOTE TO EDITORS: The Uranus movie will air on NASA Television, Monday March 29 during the noon video file. NASA Television is broadcast on the GE2 satellite located on transponder 9C, at 85 degrees West longitude, frequency 3880.0 MHz, audio 6.8 MHz. The movie is also available on the Internet at:

http://oposite.stsci.edu/pubinfo/latest.html
http://oposite.stsci.edu/pubinfo/pictures.html

News Release

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For Release

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March 29, 1999

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RELEASE: 99-48

DEPLOYED ANTENNA SENDING STREAMS OF NEW MARS IMAGES

A steady stream of new data from Mars, including high-resolution images, will begin arriving next week at Earth receiving stations following yesterday's deployment of the Mars Global Surveyor's high-power communications antenna.

"Having a deployed, steerable high-gain antenna is like switching from a garden hose to a fire hose in terms of data return from the spacecraft," said Joseph Beerer, flight operations manager for Mars Global Surveyor at NASA's Jet Propulsion Laboratory.

"Up until now, we have been using the high-gain antenna in its stowed position, so periodically during the first three weeks of our mapping mission, we had to stop collecting science data and turn the entire spacecraft to transmit data to Earth," Beerer explained. "Now that the high-gain antenna is deployed and steerable, we have the ability to simultaneously study Mars and communicate with Earth."

The antenna was deployed at about midnight EST, Sunday, March 28. It had been stowed since launch in November 1996 to reduce its chances of being contaminated by exhaust from the spacecraft's main engine, which was fired periodically throughout the mission. The spacecraft entered orbit around Mars in September 1997 and used a technique called aerobraking to gradually lower the spacecraft's altitude to the desired orbit for mapping. The mapping mission began March 9; full-scale mapping begins April 4.

Because engineers were uncertain that a device intended to dampen the force of the deployment would work correctly, engineers used the antenna in its stowed configuration for the first three weeks of mapping. This allowed the team to meet the mission's minimum science objectives before risking the antenna deployment.

- more

Last night, the dish-shaped high-gain antenna, 5 feet in diameter, was deployed on a 6.6-foot-long boom and was pushed outward from the spacecraft by a powerful spring. The suspect dampening device worked as it should have, cushioning the force of the spring and limiting the speed of the deployment, similar to the automatic closer on a screen door. With the antenna successfully deployed, Mars Global Surveyor will return a nearly constant stream of observations of Mars for the next two years.

Information from the science instruments is recorded 24 hours a day on solid state recorders on board the spacecraft. Once a day, during a 10-hour tracking pass over a Deep Space Network antenna, the data are transmitted to Earth. In addition, every third day a second tracking pass is used to transmit data "live" at a very high rate directly to Earth without being put on the recorder. These data, which will contain high-resolution images of Mars, will be transmitted at rates between 40,000 and 80,000 bits per second.

Mars Global Surveyor is managed by the Jet Propulsion Laboratory for NASA's Office of Space Science, Washington, DC. Lockheed Martin Astronautics of Denver developed and operates the spacecraft. The Jet Propulsion Laboratory is a division of the California Institute of Technology.

Further information about the mission is available on the Internet at:

http://mars.jpl.nasa.gov/mgs/index.html

- end -

News Release

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April 2, 1999

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NOTE TO EDITORS: N99-17

BRIEFING: PERFORMANCE OF DEEP SPACE 1 ADVANCED TECHNOLOGIES

NASA's Deep Space 1 team will report next week on the mission's revolutionary technologies, including an exotic ion propulsion system and a robotic navigator that will guide the spacecraft to an asteroid rendezvous this summer.

The team will brief reporters at NASA's first Space Technology Update at 2 p.m. EDT Tuesday, April 6, in the James E. Webb Auditorium at NASA Headquarters, 300 E St. SW, Washington, DC.

Launched in October 1998, Deep Space 1 is the first mission in NASA's New Millennium Program, which tests advanced technologies in flight so they can be used with confidence on scientific spacecraft in the 21st century. Two of Deep Space 1's technologies are advanced science instruments that will be featured during the mission's close flyby of the asteroid 1992 KD in July. This encounter, which will be guided by an autonomous navigation system aboard Deep Space 1, will be previewed at the briefing.

Briefing topics will include:

- a program overview, by Dr. Peter Ulrich, director of the Advanced Technology and Mission Studies Division in the Office of Space Science at NASA Headquarters;
- an overview of mission results, by Dr. Marc Rayman, the Deep Space 1 deputy mission manager and chief mission engineer at NASA's Jet Propulsion Laboratory, Pasadena, CA;
- testing of the ion engine, by Tom Bond, program manager at Hughes Electron Dynamics Division, Torrance, CA;
- mission technologies designed to make spacecraft more autonomous, by Dr. Guy Man, chair of the New Millennium Program's integrated product development at the Jet Propulsion Laboratory;

-more-

• potential uses of Deep Space 1 technologies on future science missions, by Dr. Faith Vilas, space scientist at NASA's Johnson Space Center, Houston, TX.

Deep Space 1 project engineers will staff exhibits of hardware and technology related to the mission in the west lobby of NASA Headquarters.

Extensive information on Deep Space 1, including a 37-page press kit, is available on the Internet at:

http://www.jpl.nasa.gov/ds1news/

The briefing will be carried live on NASA Television, which is available on transponder 9C of the GE-2 satellite at 85 degrees West longitude, vertical polarization, frequency 3880 MHz, audio of 6.8 MHz. Two-way question and answer capability will be available for news media at NASA centers.

-end-

News Release

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For Release

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April 6, 1999

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RELEASE: 99-49

EXOTIC TECHNOLOGIES FINISH ROAD TEST ON COSMIC HIGHWAY

NASA's Deep Space 1 mission has successfully demonstrated most of its exotic technologies in space -- including an ion engine that is expected to be ten times more efficient than conventional liquid or solid rocket engines -- proving they are ready for use in science missions of the 21st century.

Of the 12 advanced technologies onboard the spacecraft, seven have completed testing, including the ion propulsion system, solar array and new technologies in communications, microelectronics and spacecraft structures.

"We've taken these technologies around the test track, and now they're ready for the production line," said Dr. Marc Rayman, deputy mission manager and chief mission engineer for Deep Space 1 at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

Launched October 24, Deep Space 1 is the first mission under NASA's New Millennium Program, which features flight testing of new technology, rather than science, as its main focus. These new technologies will make spacecraft of the future smaller, cheaper, more reliable and more independent of human control.

By summer, engineers expect to have finished testing all 12 advanced technologies aboard the spacecraft.

Testing of two technologies that make the Deep Space 1 less reliant on humans is 75 percent complete, while testing of a third is scheduled to begin in May. These technologies include a robotic navigator, called AutoNav, that will guide the spacecraft to a rendezvous with asteroid 1992 KD on July 29 without active human control from the Earth.

-more-

In addition, Deep Space 1's two advanced science instruments -- a combination camera/spectrometer and an instrument that studies electrically charged particles emitted by the Sun and other sources -- are on schedule, having finished 75-percent of their tests.

"What has pleased us more than anything is how well the technologies have been working in general," Rayman said, noting that their performance is remarkably close to engineers' estimates developed before launch.

"Of course, everything hasn't worked perfectly on the first try," Rayman added. "If it had, it would mean that we had not been sufficiently aggressive in selecting the technologies. Diagnosing the behavior of the various technologies is a fundamental part of Deep Space 1's objective of enabling future space science missions."

When the ion propulsion system was first activated November 10, the engine shut itself off after 4-1/2 minutes, and engineers were unable to restart it later that day. During the next attempt two weeks later, however, the engine started up easily and has performed flawlessly since then, logging more than 1,300 hours of operation.

Engineers believe the problem was caused by a piece of grit stuck to high-voltage grids within the ion engine. The grit was later dislodged, they believe, when parts expanded and contracted as the ion engine was exposed alternately to sunlight and shade.

Engineers also discovered after launch that stray light enters the camera/spectrometer, resulting in streaks of light when pictures are taken with a long exposure. The streaks are a result of how the instrument was mounted on the spacecraft, Rayman said.

The camera should be able to take acceptable pictures when Deep Space 1 flies by asteroid 1992 KD this summer, because it will use short exposures.

Despite such glitches, the great majority of the advanced technologies have worked extremely well, according to Rayman. "Mission designers and scientists can now confidently use them on future missions," he said.

Deep Space 1 will continue testing technologies until its prime mission concludes on September 18. NASA is considering a possible extended mission that would take the spacecraft on flybys of two comets in 2001.

The Deep Space 1 mission is managed for NASA's Office of Space Science, Washington, DC, by JPL, a division of the California Institute of Technology, Pasadena, CA. Spectrum Astro Inc., Gilbert, AZ, was JPL's primary industrial partner in spacecraft development.

- end -

News Release

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For Release

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April 8, 1999

RELEASE: 99-50

McCLAIN TO LEAVE NASA;
HAWES NAMED ACTING CHIEF OF SPACE STATION

Gretchen McClain, a senior space station official at NASA Headquarters, has announced she will leave the Agency to return to private industry later this month.

Michael Hawes, NASA's chief engineer for the space station, will replace McClain in an acting role.

"Gretchen's vision, technical expertise and leadership was a key factor in bringing the station to reality," said Joseph Rothenberg, Associate Administrator for Space Flight. "I along with the entire NASA team will miss her. Michael will ensure that we maintain that leadership and expertise until a permanent selection is made."

McClain was selected to the position of Deputy Associate Administrator for Space Development (Space Station) in 1997. Her primary duties included directing the space station budget; establishing and implementing station policy and coordinating external communications; and liaison activities with the Administration, Congress, industry and the station's international partners.

"It was a difficult decision to return to the private sector," McClain said, "having been an integral part of the space station program since its initial development, and seeing first hand the birth of a new star on the horizon when the first two station elements were placed in orbit. However, Mike's impressive skills and professionalism will make that star even brighter."

Hawes joined NASA in 1978 and served as the senior engineer in the former space station office in Reston, VA. Before that, he served in several technical and managerial positions at NASA's Johnson Space Center in Houston. He has coordinated the integration of experiments and commercial satellites on the space shuttle; served as Payload Officer for several shuttle missions; and was a member of the mission control team for the reentry of

- more -

Skylab in 1979. Throughout his career he has received several Agency awards for his contributions to human space flight.

"I'm fortunate to have been so closely involved in space flight activities and fully understand the technical and managerial challenges we face. I'm prepared to meet those challenges," Hawes said.

-end-

Media Advisory

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For Release

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April 13, 1999

MEDIA ADVISORY: m99-72

NASA AND OTHER FEDERAL AGENCIES REMEMBER THE HOLOCAUST

NASA Administrator Daniel S. Goldin will give the welcoming remarks Thursday, April 15, 1999, at a federal ceremony to commemorate the Holocaust.

The program is part of the worldwide Holocaust Week of Remembrance (April 11-16). The event will begin at noon at the Lincoln Theater, 1215 U St. NW, Washington, DC. Secretary of Labor Alexis M. Herman will serve as the Mistress of Ceremonies.

This year's theme is "We Were There, Voices from History." Other guest speakers include Leo Bretholz, who survived many escapes, captures, releases and incarcerations, and Eugene deThassy, a Hungarian who spent years saving Jewish citizens and Allied prisoners of war.

NASA and 18 other federal agencies will sponsor the program. The event is open to the public and media are invited to attend.

-end-

News Release

National Aeronautics and
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For Release

April 13, 1999

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NOTE TO EDITORS: N99-19

NEUROLAB TEAM TO DISCUSS RESULTS, POTENTIAL HEALTH BENEFITS

Scientists and astronauts will gather in Washington this week to discuss space research that may lead to better treatments for patients suffering from Alzheimer's disease, motion sickness, balance disorders, insomnia and other ailments.

Media representatives are invited to attend the symposium. To schedule an interview with Neurolab researchers, reporters should contact Renee Juhans at 202/358-1712.

More than 20 researchers will present the latest findings from last year's Neurolab space shuttle mission at a symposium on April 14-16 at the National Academy of Sciences, 2101 Constitution Avenue NW, Washington, DC. Members of the Neurolab crew also will share their unique perspective on the mission and provide their view of the science results.

Neurolab, NASA's contribution to the Decade of the Brain, focused on expanding understanding of the brain and the central nervous system. Its disciplined and focused studies show a strong promise for improving life on Earth. The following selected findings represent a few examples of the knowledge that will evolve from the mission:

• **Alzheimer's disease and epilepsy**. Patients suffering from Alzheimer's disease and epilepsy may benefit from knowledge gained from a study that looked at how the brain maintains a sense of direction. For example, if you have parked your car in the center of town and then walked several blocks to run errands, how do you find your way back to the car? By retracing your steps (path integration)? By remembering the trees, shops and parks you passed on the way (landmark navigation)? Alzheimer's disease and epilepsy are fundamentally linked to damage to the hippocampus area of the brain. Information from Neurolab on how this region of the brain processes spatial and navigational information may lead to improved strides in the fight against these disorders.

- more -

• **Brain Injuries.** The human brain has an innate understanding of how the world works, which allows it to anticipate movements and allows us to react appropriately. For example, when a ball is thrown toward you, your brain interprets the speed and location of the ball and commands your arm into a position to catch it. People whose brains have been damaged by injury or illness lack this innate knowledge. During the Neurolab Ball Catch experiment, the astronauts' brains had to readapt to the change in the speed of a ball no longer controlled by gravity. The results from this study should lead to new diagnostic and rehabilitation tools to help people with brain injuries.

• **Muscle Atrophy.** Aging or illness can cause muscles to waste, or atrophy. Investigations have found that young animals need normal weight-bearing activity, such as walking or running, to establish muscle growth. In addition, a particular thyroid hormone is required to stimulate muscles to move, allowing us to run and walk. Studies conducted during Neurolab indicate that a natural reduction in this hormone, which occurs during aging, may play a key role in the wasting of muscle. This information may help develop preventive measures to benefit those who suffer from muscle atrophy.

• **Sleep Deprivation or Disruption.** On Earth and in space, some people suffer from sleep deprivation or disruption. Sleep studies conducted during Neurolab are expected to benefit not only astronauts but also others who have trouble sleeping, including shift workers, the elderly and people traveling across time zones. Data from the studies will provide insight into the causes of sleep disruption and whether melatonin could be an effective sleep aid.

More information is available on the World Wide Web at URL:

http://lsda.jsc.nasa.gov/neurolab/symposium/contact.html

Neurolab investigations were carried out during a 16-day mission in April and May 1998 aboard Space Shuttle Columbia. This research was supported by the National Institutes of Health, the Office of Naval Research, the National Science Foundation, the Spanish Ministry of Education and Culture and the Canadian, European, French, German and Japanese space agencies.

-end-

News Release

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For Release

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April 13, 1999

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RELEASE: 99-51

ASTRONOMERS DISCOVER 'MIDDLEWEIGHT' BLACK HOLES

The field of black holes, formerly dominated by heavyweights packing the gravitational punch of a billion Suns and lightweights just a few times heavier than our Sun, now has a new contender -- a just-discovered mysterious class of "middleweight" black holes, weighing in at 100 to 10,000 Suns.

Astronomers at NASA and Carnegie Mellon University have independently found evidence for the new type of black holes in spiral-shaped galaxies throughout the Universe. The newfound black holes, formed by an unknown process, are 100 to 10,000 times as massive as the Sun, yet each occupies less space than the Moon.

A black hole is a region of space where the force of gravity is so powerful that nothing, not even light, can escape its pull. Until now, scientists knew about two types of black holes: stellar and supermassive. Stellar black holes are the remains of dead stars several times heavier than the Sun, compressed to a diameter of a few miles or less. Supermassive black holes have mind-boggling masses of one million to one billion Suns and may have formed in the early universe from giant gas clouds or from the collapse of clusters of immense numbers of stars.

The astronomers identified the new class of black holes through X-ray light, the final cries of energy emitted from gas and particles spiraling into a black hole. The discovery will be announced today at the meeting of the High Energy Astrophysics Division of the American Astronomical Society in Charleston, SC.

Dr. Edward Colbert and Dr. Richard Mushotzky, astronomers at NASA's Goddard Space Flight Center, Greenbelt, MD, first saw hints of the new class of black holes while studying X-rays from 39 relatively nearby galaxies. Dr. Andrew Ptak and Dr. Richard Griffiths at Carnegie Mellon University studied X-ray light from a galaxy not included in

-more-

Colbert and Mushotzky's set, galaxy M82. Both teams found unique X-ray light indicative of a new black hole class. The results from both teams will be published in the Astrophysical Journal and the Astrophysical Journal Letters, respectively.

"Our intent was to understand what was producing an unusual class of X-ray luminosities near the centers of many galaxies," said Colbert. "With data from the Einstein satellite from the 1970s, we couldn't determine whether they had features associated with supermassive black holes or stellar black holes. So we took a fresh look with newer data."

Colbert and Mushotzky found telltale clues for a new type of black hole in the spectrum, or colors, of the invisible X-ray light. Such colors are judged by comparing the intensity of X-rays with shorter wavelengths to those with longer wavelengths, just as blue skylight is mostly composed of shorter wavelengths than the light from a red sunset.

Supermassive black holes are thought to power a phenomenon called Active Galactic Nuclei, which are extremely compact and energetic objects seen in the core of one percent of all galaxies and are typically very bright X-ray sources. The luminosities that Colbert and Mushotzky analyzed have colors different from those found in Active Galactic Nuclei, suggesting the source is something other than a typical supermassive black hole.

Ptak and Griffiths acted on the belief among astronomers that black holes of various sizes must exist and likely reside in "irregular" galaxies (galaxies not spiral or elliptical in shape). M82 is one such galaxy, called a starburst galaxy because of the high rate of star formation found inside. Such a scenario leads to a higher rate of supernovae, or star explosions, the precursor of stellar black holes.

"Millions of black holes and neutron stars have formed in M82 over the last 10 million years," Ptak said. "Now, we are noticing that some of these may be coalescing into a larger-mass black hole." Ptak said this is the most viable current theory for intermediate black hole formation. Colbert also said the intermediate class suggested by his and Mushotzky's observations might be formed by "the continual merging of stellar black holes." In other words, stellar black holes that approach each other too closely under certain circumstances can merge to form a more massive single black hole. This process might build objects that produce the peculiar colors of these X-ray glows.

Ptak and Griffiths used data from the Japan-U.S. Advanced Satellite for Cosmology and Astrophysics (ASCA). Colbert and Mushotzky used data from the German/US/UK ROSAT satellite and ASCA. Japanese researchers led by Dr. Tsunefumi Mizuno at the University of Tokyo have reported results similar to Colbert and Mushotzky's. Dr. Takehishi Go Tsuru at Kyoto University and colleagues have found data supporting Ptak and Griffiths' work.

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EDITOR'S NOTE: Images to support this story are available on the web at:
FTP://PAO.GSFC.NASA.GOV/newsmedia/HEAD/NBH

News Release

National Aeronautics and
Space Administration

Washington, DC 20546
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For Release

April 21, 1999

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NOTE TO EDITORS: N99-20a

NASA AND USGS TO UNVEIL FIRST LANDSAT 7 IMAGE ON EARTH DAY

NASA and the U.S. Geological Survey will unveil the first Landsat 7 image on Earth Day, April 22, opening a new era in the study of our home planet.

Dr. Ghassem Asrar, NASA Associate Administrator for the Office of Earth Science, Washington, DC, and Dr. Bonnie McGregor, Associate Director of the U.S. Geological Survey, Reston, VA, will unveil the image. Due to a scheduling conflict, NASA Administrator Daniel S. Goldin will be unable to unveil the image as previously announced.

The resolution of the new image is twice as good as previous Landsat images, distinctly highlighting airport runways, dams, cities, rivers and highways.

The image unveiling is part of NASA's Earth Day and Take Our Daughters (and Sons) to Work Day activities, which will take place at 10:30 a.m. EDT in the James E. Webb Memorial Auditorium, in the west lobby of NASA Headquarters, 300 E Street SW, Washington, DC. Media are invited to attend.

Landsat 7, launched April 15, is the latest in a series that began with Landsat 1 in 1972. The satellite is gathering data from Earth's land surface and surrounding coastal regions. Analysis of the data will provide scientists with new information on deforestation, receding glaciers and crop monitoring. After on-orbit testing, NASA will turn the satellite over to the Geological Survey to manage.

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News Release

National Aeronautics and
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For Release

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April 22, 1999

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NOTE TO EDITORS: N99-21

NEW X-34 SPACEPLANE TO BE UNVEILED AT DRYDEN

NASA will unveil a new reusable, robotic rocket plane in the high desert of California next week.

The first of three X-34 demonstration vehicles will be "rolled out" at NASA's Dryden Flight Research Center, Edwards, CA, on Friday, April 30, opening an era of low-cost reusable space planes.

The X-34, a single-engine rocket plane, will fly itself using onboard computers. The vehicle is approximately 58 feet long, 28 feet wide at wing tip and 11 feet tall from the bottom of the fuselage to the top of the tail. The X-34 will launch from an L-1011 airliner and will reach altitudes of up to 250,000 feet and travel up to eight times faster than the speed of sound.

Flights of the X-34 will test many new technologies: composite material structures, composite tanks and new, integrated avionics. The vehicle also will demonstrate the ability to fly through inclement weather, land horizontally at a designated landing site, and safely

- more -

abort during flight. The planned 27 flights within a year will demonstrate the program's ability to fly within 24 hours of its last mission, using a small ground crew.

The X-34 has completed ground vibration tests, ensuring there will be no potentially hazardous vibrations during flight. The L-1011 and the X-34 prototype were tested separately and together at Dryden.

After the rollout, the X-34 will be mounted underneath the L-1011 and flown on "captive-carry" flights to allow the Federal Aviation Administration to approve modifications to the L-1011. When powered flights begin for X-34, the demonstrator will be carried aloft and separate from the L-1011 before igniting its rocket engine. Following the powered portion of flight, the unpiloted X-34 will land horizontally, initially on a dry lakebed and eventually on a runway.

The April 30 rollout, which is open to the media, will air live on NASA Television. A press conference will be held at 1 p.m. EDT, and the rollout ceremony will take place at 2 p.m. EDT. For accreditation and more information, reporters should contact Leslie Mathews at Dryden Public Affairs on (661) 258-3893.

NASA TV is available on GE-2, transponder 9C at 85 degrees west longitude, with vertical polarization. Frequency is on 3880.0 megahertz, with audio on 6.8 megahertz.

In a cooperative program among NASA Centers, Dryden will provide flight-testing and ground vibration testing. NASA's Marshall Space Flight Center, Huntsville, AL, manages the X-34 project. Orbital Sciences Corporation Dulles, VA, is designing, developing and testing the vehicle.

- end -

News Release

National Aeronautics and
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For Release
May 3, 1999

RELEASE: 99-55

NASA TELEMEDICINE: IMPROVING HEALTH FROM A DISTANCE

Doctors at five distant sites in the United States will demonstrate how to use NASA telemedicine to diagnose patients, practice operations and train, using 3-D medical images carried by a high-capacity computer network.

The NASA telemedicine system, to be demonstrated Tuesday at NASA's Ames Research Center, Moffett Field, CA, has potential for improving health care at the far corners of the Earth by linking remote sites with the best medical minds and facilities.

During the demonstration, physicians will use 3-D, scanned images of patients' hearts, skulls and other body parts. On computer screens, doctors at the five sites will see every procedure in stereo 3-D as each physician manipulates images of the virtual patient. The specialists will use high-fidelity, NASA-developed 3-D imaging software to analyze and discuss patients.

"We're looking at methods to bring the clinic to the patient, rather than the patient to the clinic," said Dr. Muriel Ross, leader of NASA's effort at Ames to develop care of patients from a distance. "We're supporting remote collaborations of doctors at different locations on Earth. This will prepare us to use the technology for spacecraft crews traveling to the International Space Station, Mars or other planets, where specialists may not be available."

The "Virtual Collaborative Clinic" will link physicians from the Cleveland Clinic, participating at the NASA Glenn Research Center, Cleveland, OH; Stanford University Medical Center, Stanford, CA; Salinas Valley Memorial Hospital, Salinas, CA, interacting from the University of California, Santa Cruz; the Northern Navajo Medical Center, Shiprock, NM; and Ames. The concept and software are under development at Ames' Center for Bioinformatics.

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"Cleveland Clinic will discuss a patient treated for an enlarged heart chamber," said Ross. "If you cut a piece out and make the chamber smaller, you improve the way the heart works. During the demonstration, you'll be able to see the before and after conditions in 3-D."

The Cleveland Clinic, Salinas Hospital and the Northern Navajo Medical Center will present heart work. Salinas will show an infant's defective heart beating. Stanford physician Dr. Michael Stephanides will simulate facial reconstructive surgery from Ames.

"This demonstration is being done to support remote collaborations -- to plan surgeries and to make diagnoses, and eventually even to operate from a remote site," Ross said. "Specialists could guide a general practitioner, or you could guide a robot operator on a spacecraft from a great distance."

The NASA Bioinformatics team plans to promote the development of systems for scanning patients onboard spacecraft with sonic machines. Specialists collaborating from different places on Earth could plan a medical procedure, then send it to an astronaut physician to perform.

"You could try the operation in virtual reality a number of times, storing the procedure in computer memory, and then you could use the approach that's best during the actual operation," Ross said.

"We have also talked about projecting a computer image onto the patient," Ross said. "Projected images could guide doctors during operations."

More information about the Center for Bioinformatics is on the Internet at:

http://biocomp.arc.nasa.gov/home.html

-end-

News Release

National Aeronautics and
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For Release

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April 29, 1999

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RELEASE: 99-56

MAGNETIC STRIPES PRESERVE RECORD OF ANCIENT MARS

NASA's Mars Global Surveyor has discovered surprising evidence of past movement of the Martian crust, further evidence that ancient Mars was a more dynamic, Earth-like planet than it is today.

Scientists using the spacecraft's magnetometer have discovered banded patterns of magnetic fields on the Martian surface. The adjacent magnetic bands point in opposite directions, giving these invisible stripes a striking similarity to patterns seen in the crust of Earth's sea floors. On the Earth, the sea floor spreads apart slowly at mid-oceanic ridges as new crust flows up from Earth's hot interior. Meanwhile, the direction of Earth's magnetic field reverses occasionally, resulting in alternating stripes in the new crust that carry a fossil record of the past hundreds of million years of Earth's magnetic history, a finding that validated the once-controversial theory of plate tectonics.

"The discovery of this pattern on Mars could revolutionize current thinking of the red planet's evolution," said Dr. Jack Connerney of NASA's Goddard Space Flight Center, Greenbelt, MD, an investigator on the Global Surveyor's magnetometer team. "If the bands on Mars are an imprint of crustal spreading, they are a relic of an early era of plate tectonics on Mars. However, unlike on Earth, the implied plate tectonic activity on Mars is most likely extinct."

Alternate explanations for the banded structure may involve the fracturing and breakup of an ancient, uniformly magnetized crust due to volcanic activity or tectonic stresses from the rise and fall of neighboring terrain.

- more -

"Imagine a thin coat of dried paint on a balloon, where the paint is the crust of Mars," explained Dr. Mario Acuña of Goddard, principal investigator on the Global Surveyor magnetometer. "If we inflate the balloon further, cracks can develop in the paint, and the edges of the cracks will automatically have opposite polarities, because nature does not allow there to be a positive pole without a negative counterpart."

Peer-reviewed research based on the observations will be published in the April 30 issue of the journal Science.

The observations of the so-called magnetic stripes were made possible because of Mars Global Surveyor's special aerobraking orbit. This process of dipping into the upper atmosphere of Mars to gradually shape the probe's orbit into a circle was extended due to a problem with a solar panel on the spacecraft. The lowest point of each elliptically shaped orbit curved below the planet's ionosphere, allowing the magnetometer to obtain better-than-planned regional measurements of Mars.

"At its nominal orbit more than 200 miles high, the instruments face too much magnetic interference, and they do not have the resolution to detect these features," Acuña noted. "We began with misfortune, and ended up winning the lottery."

The bands of magnetized crust apparently formed in the distant past when Mars had an active dynamo, or hot core of molten metal, which generated a global magnetic field. Mars was geologically active, with molten rock rising from below cooling at the surface and forming new crust. As the new crust solidified, the magnetic field that permeated the rock was "frozen" in the crust. Periodically, conditions in the dynamo changed and the global magnetic field reversed direction. The oppositely directed magnetic field was then frozen into newer crust.

"Like a Martian tape recorder, the crust has preserved a fossil record of the magnetic field directions that prevailed at different times in the ancient past," Connerney said. When the planet's hot core cooled, the dynamo ceased and the global magnetic field of Mars vanished. However, a record of the magnetic field was preserved in the crust and detected by the Global Surveyor instrument.

The mission's map of Martian magnetic regions may help solve another mystery -- the origin of a striking difference in appearance between the smooth, sparsely cratered northern lowlands of Mars and the heavily cratered southern highlands. The map reveals that the northern regions are largely free of magnetism, indicating the northern crust formed after the dynamo died.

"The dynamo likely died a few hundred million years after Mars' formation. One possibility is that later asteroid impacts followed by volcanic activity heated and shocked large areas of the northern crust, obliterating any local magnetic fields and smoothing the terrain," Acuña said. "When the crust cooled, there was no longer a global magnetic field to become frozen in again."

The map also identifies an area in the southern highlands as the oldest surviving unmodified crust on Mars. This area on Mars is where the magnetic stripes are most prominent. The bands are oriented approximately east-to-west and are about 100 miles wide and 600 miles long, although the longest band stretches more than 1,200 miles.

"The bands are wider than those on Earth, perhaps for a couple of reasons," Connerney said. "The Martian crust could have been generated at a greater rate, causing a given magnetic field to be imprinted over a wider area before it reversed direction. Second, the Martian magnetic field may have reversed direction less frequently, which would have given more time for any one field direction to imprint itself in the steadily moving crust, resulting in wider bands.

"In order to call this pattern a crustal spreading center like that observed in the mid-oceanic ridges on Earth, we need to find a point of symmetry, where the pattern on one side matches the pattern on the other. We have not yet found evidence of this type of symmetry," Connerney added.

Graphics of the magnetometer data, other supporting material and general information on the Global Surveyor mission may be found on the Internet at:

FTP://PAO.GSFC.NASA.GOV/newsmedia/MARS/MAGNETIC/

http://mpfwww.jpl.nasa.gov/mgs/index.html

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News Release

National Aeronautics and
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Washington, DC 20546
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For Release

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April 30, 1999

RELEASE: 99-57

CLOUDSAT TO REVOLUTIONIZE STUDY OF CLOUDS AND CLIMATE

NASA will take a revolutionary, global look at clouds with a new spaceborne radar capable of peering deep into their interior to study their structure, composition and effects on climate.

Cloudsat, which will fly in 2003, will use an advanced radar to "slice" through clouds to see their vertical structure, providing a completely new observational capability from space -- current weather satellites can only image the uppermost layers of clouds. Cloudsat will be the first satellite to study clouds on a global basis.

"A trio of satellites will provide unprecedented information on how clouds help transfer solar energy to and from our planet's atmosphere," said Dr. Ghassem Asrar, Associate Administrator for Earth Sciences, NASA Headquarters, Washington, DC. "The data from Cloudsat will help us understand changes in the Earth's climate on global, regional and local scales. An important contribution of Cloudsat is the way it will fly in formation with the Earth Observing System-PM and the PICASSO-CENA satellites."

PICASSO-CENA, a cooperative mission between NASA and France, will study the role of transparent, thin clouds and aerosols, small atmospheric particles, and their effect on solar-energy transfer.

The Cloud Profiling Radar of Cloudsat will study the three-dimensional structure of most clouds important to weather and climate. This capability complements an instrument aboard PICASSO-CENA, which will observe the vertical structure of thin clouds and aerosols. These two missions will provide critically needed satellite measurements that will help researchers understand how the Earth's solar energy and climate interact on a global scale.

Cloudsat data also will complement the Earth Observing System-PM satellite, which will collect data on the dynamics of Earth's atmosphere, and the Triana mission, both to be launched in 2000.

- more -

Dr. Graeme Stephens of Colorado State University, Ft. Collins, CO, will be principal investigator of the Cloudsat mission. NASA's Jet Propulsion Laboratory, Pasadena, CA, will manage the international mission, which will include participation from the United States, Canada, Germany and Japan.

The estimated cost of the Cloudsat mission is $135 million. NASA's contribution will be approximately $111 million, with additional funding provided by the Canadian Space Agency, the U.S. Department of Energy and the U.S. Air Force. The Canadian Space Agency also is developing key radar components and contributing scientific expertise. Ball Aerospace, Boulder, CO, will build the Cloudsat spacecraft.

The Cloudsat mission continues the strong commitment to Earth Systems Science undertaken by NASA's Office of Earth Science, which oversees a long-term, coordinated research enterprise designed to study the Earth as a global environmental system.

-end-

News Release

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For Release

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May 4, 1999

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NOTE TO EDITORS: N99-26

NASA TO RENAME CENTER IN JOHN GLENN'S HONOR

On Friday, May 7, NASA will pay tribute to John Glenn, a symbol of the Agency's past, present and future, by renaming the Agency's Ohio center the John H. Glenn Research Center at Lewis Field.

The salute to Ohio's native son and former senator will begin at approximately 10:45 a.m. EDT with a parade at the center for employees, registered media and honored guests. The parade will lead into a picnic, where everyone will gather to eat and listen to music performed by the all-astronaut band, "Max Q."

The ceremony, which is scheduled to begin between 2 and 2:30 p.m. EDT, will be held in the Glenn Hangar. NASA Administrator Daniel Goldin, U.S. Senator Mike DeWine and Glenn Center Director Donald Campbell will participate.

In 1962, Glenn was the first American to orbit the Earth. After leaving NASA and serving as a Senator from Ohio, he returned to space aboard the Space Shuttle in October 1998. During that mission, he took part in research into how the body changes during space flight, and how those changes may be similar to the aging process. Glenn's research was a precursor to future studies that will be done aboard the International Space Station.

NASA Television will provide a live broadcast of the ceremony. NASA TV is available through the GE-2 satellite, Transponder 9C, located at 85 degrees West longitude, vertical polarization, with a frequency of 3880 Mhz, and audio at 6.8 MHz.

Media representatives wishing to attend this event should call the Glenn Media Relations Office at 216/433-2901 for access to the Center.

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For Release:
May 5, 1999

LAUNCH DATE SET FOR SHUTTLE MISSION TO SPACE STATION

NASA managers today set May 20 as the launch date for Space Shuttle Discovery and an international crew on an inaugural visit to the orbiting International Space Station.

Discovery will spend six days linked to the new outpost on Shuttle mission STS-96 as the crew outfits Zarya and Unity. The Shuttle will carry more than two tons of supplies to be stored aboard the station, ranging from food and clothes for the first crew to laptop computers, a printer and cameras.

"We are about to begin one of the most versatile years ever for the Space Shuttle," Space Shuttle Program Manager Ron Dittemore said. "In the next seven months, we plan to do things that showcase almost all of the Shuttle's unique capabilities – assembly of the space station; launch, repair and maintain satellites; and map the Earth. The team has done a fantastic job preparing Discovery for this flight, and we're ready to get off to a great start."

Discovery's May 20 launch window opens at about 9:32 a.m. EDT and extends for approximately 10 minutes. On the day of launch, managers may adjust the launch time within that window to optimize the Shuttle's performance.

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Discovery's crew, led by U.S. Navy Commander Kent Rominger, reflects the global nature of the station with three of five international partners represented. Included are cosmonaut Valery Tokarev, a colonel in the Russian Air Force, and Canadian Space Agency astronaut Julie Payette, who will become the first Canadian to board the station. U.S. Air Force Lt. Col. Rick Husband, will serve as pilot, and a space walk will be performed by astronauts Tammy Jernigan, Ph.D., and Dr. Daniel Barry. Jernigan and Barry will attach a U. S.-built "space walkers' crane" and parts of a Russian-built crane to the exterior for use on future missions. Astronaut Ellen Ochoa rounds out the crew as flight engineer and operator of the Shuttle's mechanical arm.

Discovery's mission will set the stage for the launch this fall of the Russian-provided Service Module, the first station living quarters, and the arrival in early 2000 of the first three-person station crew.

-- end --

News Release

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May 5, 1999

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For Release

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May 10, 1999

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RELEASE: 99-58

NASA, USDA WILL BRING SPACE TECHNOLOGY DOWN TO EARTH

A new partnership between NASA and the U.S. Department of Agriculture (USDA) could result in updated maps of Yellowstone National Park, a better understanding of wildfires and improved management of California vineyards.

Under the partnership, NASA has selected 13 research proposals that will apply remote-sensing data -- images of the Earth taken by satellites -- to issues on the ground: forest mapping, soil studies, wildfires, range management, flood-plain drainage and crop monitoring.

"This new partnership between NASA and USDA demonstrates the diverse and wide-ranging applications of NASA's Earth Science research and its relevance to the American people," said Dr. Ghassem Asrar, Associate Administrator of Earth Sciences, NASA Headquarters, Washington, DC. "The Office of Earth Sciences is eager to form new partnerships with other government agencies, industry and public groups to expand America's use of our Earth Science research."

"We in the Department of Agriculture, especially the Cooperative State Research, Education, and Extension Service are very excited about partnering with NASA on these research projects," said I. Miley Gonzalez, Under Secretary for Research, Economics and Education. "We recognized that there were areas of research where images from space combined with ground surveys can greatly benefit our mapping efforts. We are looking forward to these pilot projects and hope they may lead to future partnerships between our organizations to explore land management and precision agriculture topics."

-more-

The award value for the 13 projects, which involve 11 universities, 11 private companies, 17 federal agency facilities and four state and local governments, is $7 million over three years. NASA selected the 13 projects from 180 proposals.

Researchers will use a variety of public and private spaceborne and aircraft-mounted Earth-observing instruments along with ground observations in their studies.

For forestry studies, NASA, the U.S. Forest Service and universities will use the recently launched Landsat 7 and other satellites to create valuable new maps of Yellowstone and other public lands.

Satellite imagery also can provide researchers at the Forest Service and universities with maps of vegetation in areas prone to wildfires -- firefighters can determine which types of plants are more likely to fuel wildfires and better predict what paths such fires may take.

Using airplanes and spacecraft that observe characteristics of grape vines invisible to the naked eye, researchers can "see" when vines are ill, allowing vintners to act before many vines are lost to disease. This research will allow America's billion-dollar wine industry to manage its vineyards more cost-effectively.

Additional information on the research projects, including the names of the universities, companies and federal facilities involved, can be found on the Internet at:

http://earth.nasa.gov/nra/archive/nra98oes09/winners.html

The partnership between the space program and USDA is part of NASA's Earth Science enterprise, a coordinated research program that studies the Earth's land, oceans, ice, atmosphere and life as a total science system. The initiative is part of an aggressive new strategy devoted to significantly increasing the application of NASA remote sensing data, information, science and technologies to societal needs, ensuring maximum return on taxpayer investments.

- end -

News Release

National Aeronautics and
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For Release

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May 13, 1999

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RELEASE: 99-59

SYNTHETIC VISION COULD HELP PILOTS STEER CLEAR OF FATALITIES

NASA and industry are developing revolutionary cockpit displays to give airplane crews clear views of their surroundings in bad weather and darkness, which could help prevent deadly aviation accidents.

Limited visibility is the greatest factor in most fatal aircraft accidents, said Michael Lewis, director of the Aviation Safety Program at NASA's Langley Research Center in Hampton, VA. NASA has selected six industry teams to create Synthetic Vision, a virtual-reality display system for cockpits, offering pilots an electronic picture of what's outside their windows, no matter the weather or time of day.

"With Global Positioning Satellite signals, pilots now can know exactly where they are," said Lewis. "Add super-accurate terrain databases and graphical displays and we can draw three-dimensional moving scenes that will show pilots exactly what's outside. The type of accidents that happen in poor visibility just don't happen when pilots can see the terrain hazards ahead."

The NASA Aviation Safety Program envisions a system that would use new and existing technologies to incorporate data into displays in aircraft cockpits. The displays would show hazardous terrain, air traffic, landing and approach patterns, runway surfaces and other obstacles that could affect an aircraft's flight.

Industry teams submitted 27 proposals in four categories: commercial transports and business jets, general aviation aircraft, database development and enabling technologies. NASA and researchers from the Federal Aviation Administration and Department of Defense evaluated the proposals' technical merit, cost and feasibility.

- more -

NASA has committed $5.2 million that will be matched by $5.5 million in industry funds to advance Synthetic Vision projects over the next 18 months. More money is expected to be designated later to accelerate commercialization and make some systems available within four to six years.

Among the team leaders selected for the first phase of the program are: Rockwell Collins, Inc., Cedar Rapids, IA; AvroTec, Inc., Portland, OR; Research Triangle Institute, Research Triangle Park, NC; Jeppesen-Sanderson, Inc., Englewood, CO; the Avionics Engineering Center of Ohio University, Athens, OH; and Rannoch Corporation, Alexandria, VA.

Rockwell Collins, Inc. will receive funds to develop synthetic vision for airliners and business jets. The AvroTec, Inc. and Research Triangle Institute groups will use their awards to create technologies for a general-aviation synthetic vision system. A team led by Jeppesen-Sanderson, Inc. will receive funds to develop terrain database requirements and system approaches. The Avionics Engineering Center of Ohio University and Rannoch Corporation will use their awards to design specific component technologies for Synthetic Vision.

The Aviation Safety Program is a partnership with the FAA, aircraft manufacturers, airlines and the Department of Defense. This partnership supports the national goal announced by President Clinton to reduce the fatal aircraft accident rate by 80 percent in 10 years and by 90 percent over 25 years.

Because of advances in the last 40 years, commercial airliners are already the safest of all major forms of transportation. But with an accident rate that has remained relatively constant in the last decade and air traffic expected to triple over the next 20 years, the U.S. government wants to prevent a projected rise in the number of aircraft accidents.

For a complete list of industry teams please check the Internet at:

http://oea.larc.nasa.gov/news_rels/1999/May99/99-025.html

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News Release

National Aeronautics and
Space Administration

Washington, DC 20546
(202) 358-1600

For Release

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Headquarters, Washington, DC
(Phone: 202/358-1639)

May 14, 1999

James Hartsfield
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NOTE TO EDITORS: N99-27

DISCOVERY LAUNCH POSTPONED TO REPAIR FUEL TANK HAIL DAMAGE

Space Shuttle managers have postponed the launch of Discovery for at least one week to permit technicians to repair foam insulation on the external fuel tank that was damaged by a severe hail storm last weekend.

Previously scheduled for May 20, Discovery's launch on Shuttle mission STS-96 will be delayed for a minimum of at least a week to no earlier than May 27. Managers will schedule a new target launch date once the repairs near completion, probably by the middle of next week.

Discovery will be moved from the launch pad back to the Vehicle Assembly Building at NASA's Kennedy Space Center, FL, to allow repair workers to gain access to some areas of the tank that cannot be reached at the pad. The hail storm caused several small indentations in the tank's foam insulation, and managers are concerned that ice could form in the areas when the tank is filled with super-cold propellants for launch. Such areas of ice could cause debris damage to the Shuttle after liftoff. Similar repairs to the external fuel tank's foam insulation were performed once before, prior to Shuttle mission STS-70 in July 1995.

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NOTE TO EDITORS: N99-28

STS-96 MISSION PRESS KIT AVAILABLE ONLINE

The press kit for the flight of Discovery on the STS-96 mission to the International Space Station is now available online.

The press kit contains more information than ever before, including updated graphics as well as additional facts and statistics. Discovery is scheduled to launch from NASA's Kennedy Space Center, FL, no earlier than May 27 to carry seven astronauts to visit the orbiting outpost in space and prepare the space station for the March 2000 arrival of the first resident crew. The new press kit contains detailed information about the planned 10-day mission, its objectives and its crew members.

As a result of the launch delay to allow technicians to repair foam insulation on Discovery's external fuel tank, detailed timeline information for the STS-96 mission currently is not included in the online press kit. The timelines will be added to the press kit once a new launch date is established.

The STS-96 press kit can be found at the following URL:

http://www.shuttlepresskit.com/STS-96

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For Release

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RELEASE: 99-60

STUDENT-BUILT SATELLITE SCHEDULED TO LAUNCH MAY 18

The TERRIERS satellite, built by students at Boston University and scheduled for launch on May 18, could provide a much better understanding of how changes in the ionosphere -- the electrically charged region of the upper atmosphere -- affect global communication systems, satellites, cell phones and pagers.

The Tomographic Experiment using Radiative Recombinative Ionospheric Extreme ultraviolet and Radio Sources, TERRIERS, named for the University's mascot, the Boston Terrier, will launch from Vandenberg Air Force Base, CA, at 1:10 a.m. EDT on May 18.

TERRIERS will use a unique combination of space- and ground-based instruments to measure ultraviolet, radio and visible light, which are produced naturally through various chemical reactions.

TERRIERS will use this light to create high-resolution, 3-D images of the ionosphere, similar to the way a CATscan takes multiple X-rays of the human body to assemble a three-dimensional image.

Just as high-speed electrons slamming into a TV screen cause it to glow and generate a picture, when high-speed charged particles smack into the Earth's ionosphere, they cause ultraviolet light to be emitted in the form of auroras. TERRIERS will measure these emissions to better understand the upper atmosphere.

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"There is an increasing need to understand the ionosphere because changing conditions in this region adversely affect transmissions from communications satellites and impact global positioning systems," said Boston University's Daniel Cotton, principal investigator for TERRIERS. Data obtained from TERRIERS also could help scientists better predict space weather, Cotton said.

NASA's cost for the spacecraft is an estimated $6.1 million, which combined with the cost of the launch vehicle totals an estimated $12.3 million.

A three-stage Pegasus rocket, manufactured by Orbital Sciences Corp., Dulles, VA, will hold the 272-pound (123-kilogram) satellite under the belly of an L-1011 Stargazer aircraft. The aircraft will release the Pegasus rocket at an altitude of 40,000 feet over the Pacific Ocean. The Pegasus will carry the TERRIERS satellite into its 340-mile (550-kilometer) orbit. The spacecraft will then circle Earth in a polar orbit once every 96 minutes.

More than 60 Boston University students and faculty members have been involved in the science, theory, design, instrument-development and testing of TERRIERS since its selection in 1995. Sixteen Boston University undergraduate students will control the satellite from a mission control center located on campus after the satellite reaches its final orbit.

In addition to scientists from Boston University's Center for Space Physics, other collaborators on the mission include teams from the Naval Research Laboratory, Washington, DC; University of Illinois Urbana-Champaign; Massachusetts Institute of Technology's Haystack Observatory, Tyngsboro, MA; and AeroAstro, Herndon, VA.

TERRIERS is one of three NASA-funded missions under the Student Explorer Demonstration Initiative (STEDI). The Universities Space Research Association of Columbia, MD, administers the STEDI program for NASA. Information about STEDI can be found on the Internet at: **http://cass.jsc.nasa.gov/stedi/overview.html**

For more information about the TERRIERS project, visit the Boston University web site at: **http://www.bu.edu/satellite**

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For Release

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May 19, 1999

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NOTE TO EDITORS: N99-29

MANAGERS SET MAY 27 AS TARGET LAUNCH DATE FOR DISCOVERY

Having repaired hail damage to the external fuel tank's insulation, NASA managers Wednesday set May 27 as the launch date for Space Shuttle Discovery's next mission.

A nine-minute launch window will open at 6:48 a.m. EDT. Shuttle managers will determine an optimum launch time within that window one day before launch and may further refine that time during the final planned hold in the countdown nine minutes before launch.

Discovery remains inside the Kennedy Space Center's Vehicle Assembly Building as work platforms are removed. Crews repaired approximately 460 indentations on the insulation. Weather permitting, technicians plan to move Discovery back to the launch pad early Thursday morning to resume launch preparations.

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News Release

National Aeronautics and
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For Release

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May 19, 1999

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NOTE TO EDITORS: N99-30

GLENN TO DISCUSS SPACE FLIGHT, AGING STUDIES MAY 25

Former Ohio Sen. John Glenn will discuss the significance of space flight for aging research and share perspectives from his recent space flight as part of a media briefing on May 25 at the National Press Club.

The media briefing will last from 8:30 a.m. - noon EDT at the Press Club, 529 14th Street NW, Washington, DC. Media representatives are welcome to attend this event on a first-come, first-reserved basis. To reserve a seat, contact Peter Cleary at 212/752-2327.

The briefing, sponsored by the American Federation for Aging Research and NASA, will feature Glenn's talk, remarks by Sen. John Breaux, Senate Special Committee on Aging, and two panel discussions followed by question-and-answer sessions.

A panel of academic leaders will talk about the latest findings on aging research related to muscle and exercise, balance disorder, disrupted sleep and altered biological rhythms and bone disease.

Panelists include Ambassador Julia Alvarez, Dominican Republic; Dr. Daniel Bikle, University of California at San Francisco; Dr. Owen Black, Oregon University; Dr. Bill Evans, University of Arkansas; Dr. Charles Czeisler, Harvard University; Dick Sprott, Ellison Foundation; and Dr. Jeannette Takamura, Assistant Secretary for Aging, Department of Health and Human Services.

Studies of age-related health problems show that the elderly experience symptoms similar to those encountered by astronauts adapting to the microgravity environment of space flight, especially after returning from space. Collaborative research efforts between gerontologists and space life scientists in this area have been very productive.

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